

Full Throttle



Pushing The Envelope Of Flight Simulation!

April/May 1999
Volume 6 Number 2
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Airport 2000
Mig 29 Fulcrum

Round Robin:
Lake Michigan Area Tour
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**What's New in 3D
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Control Tower**
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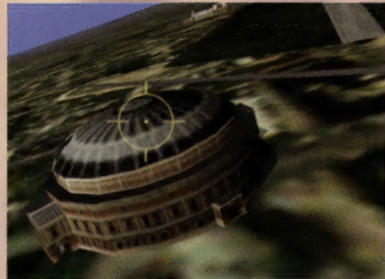
Exploding Mission Objects
Konstantin Kukushkin



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After all, nothing beats the feeling of flying a historic WWII fighter. Except, of course, filling it full of lead and watching it plummet pitifully to the ground. Collect your orders and find out how Microsoft Flight Simulator owners can get a \$10 rebate at www.microsoft.com/games/combatfs



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Full Throttle

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Pilot's Note: This information is not intended for use in actual flying situations. While the information is as realistic as possible, you should not use it for actual flying instruction. *Safe flying!*

Dear Flight SimReader,



So many flight sims to choose from

In the short history of personal computing there's never been such a wide variety of quality flight simulators available as there is today, we've seen the release of nearly a dozen major flight simulation packages including Sierra's ProPilot 99 for the civilians among you and Microsoft's Combat Flight Simulator, DID's Total Air War, Microprose's European Air Wars and Falcon 4.0, Sierra's Red Baron 3-D, Jane's WWII Fighters and Israeli Defense Force and iMagic's Warbirds V2 for the military warriors among you.

We'll soon see Nomissoft's Airline Simulator 2, Terminal Reality's Fly!, Looking Glass Technology's Flights Unlimited III and later this year perhaps Microsoft's FS2000. In short, the choice is yours.

... and flight sim accessories, Too

The Retail Squeeze

Guess what? The same applies to flight sim accessories.

Whether it's joysticks, flight yokes, rudder pedals, instrument consoles or software add-ons, competition is helping to make this a flight sim buyer's market. In fact, we dedicated 24 pages to the **Buyer's Guide** of accessories and add-ons which appeared in the December/January issue.

However...Houston, We Have a Problem.

Yet with so many choices available to flight simmers today, why is it that we receive so many phone calls, letters and emails complaining about the lack of add-ons in the retail stores?

Surprisingly, the answer again is competition. However, this is competition of a different sort. Recall that there are thousands of companies working hard to create the most innovative products for a tremendously huge audience of computer users. Of course, only a small fraction of these products are destined for flight simmers. Some companies make products for home finance; others for pre-school readers and still others for would-be graphic artists.

Where Do We Put All of This Stuff?

Your local retailer has a limited amount of shelf space, so this is where the **competition is extremely intense**. It's so competitive that only the right combination of overall quality, attractive packaging, company size and strength, advertising expenditures and persistence determine if a product reaches your retailer's shelf. This is why only a fraction of the flight sim add-ons and accessories that you read and hear about find their way to the retail channels.

(Continued on the next page)

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This is an unfortunate fact of life for both the flight sim publisher and for the flight simmer. We'd all like to see more great flight sim products make it into the stores but this may not be in the cards.

What's a Flight Simmer to Do?

What can you do to ensure that the steady stream of innovative flight sim accessories and add-ons doesn't dry up?

Go out of your way to buy the product that best fits your needs and pocketbook. This may mean that you'll have to order direct from the publisher by mail, phone, fax or Internet.

Consider one of the flight sim "specialty stores". Here's a few of the popular ones: 4CDs, Bacarella Aeronautica, ComputerMate, Flight Sim Central, Mailsoft, PC Aviator, RC Simulations, SimAviator, simMarket, SimWare.

Make the flight sim publisher **accountable**. Does the company have a polite, responsive customer service staff? Are you familiar with the company's reputation? Can you expect reasonable answers to questions about using their flight sim product? Doing this rewards companies with good products and good support.

Remind your retailer that you'd like to see more flight sim choices available in the store. Even a few requests have a way of being heard by the decision makers.

Yes, it's in Full Throttle's best interest to nurture and grow a strong flight sim 'subindustry'. So our staff will continue to keep close contacts with an incredibly talented group of flight sim companies to bring you their latest news and product information. Please support these companies and don't forget to mention **Full Throttle** when you talk to them.

Happy Flying,

Arnie Lee

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Piper Malibu Mirage™

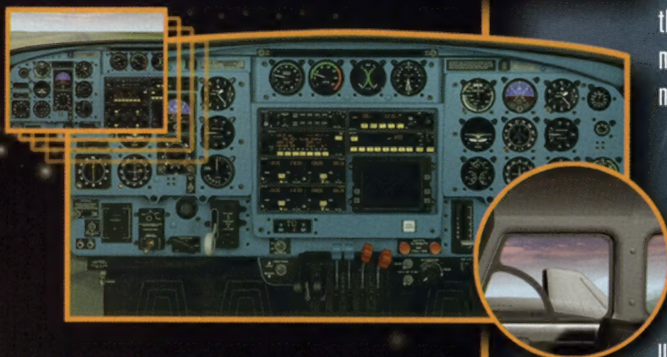
Beechcraft King Air 200™

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There's nowhere in this world you can't go. Real-time moveable sectional charts and interactive vector maps allow accurate navigation across 16,000 navaids in 200 countries, including over 13,000 runways at 9,500 airports.



The aircraft you are about to fly is fully operational. The game features accurate cockpits and avionics, all in the correct proportions and layout of the original aircraft. Every gauge, switch, and knob in the cockpit is ready for interaction, thanks to the most meticulously detailed cockpit to date, with multiple interactive interior views.

It's the most realistic general aviation flight simulator ever created for the PC. Integrated flight planner and aircraft load out allows visual planning of cross-country flights and user-defined fuel, passenger, and cargo loads.



- Everything from mountain peaks to sea level is accurately represented. The Global Digital Elevation Model (DEM) recreates elevations throughout the world.

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- FLY! Now allows you to pilot your aircraft in a variety of pre-configured conditions and scenarios.



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NOTAMS: New Products

Jane's A-10 Warthog

Jane's Combat Simulations is gearing up for the release of its new title **A-10 Warthog**.

A-10 Warthog presents brutal close-air support in one of the world's meanest attack jets. Armament includes:

One 30-mm GAU-8/A seven-barrel Gattling gun; mixed ordinance on eight under-wing and three under-fuselage pylon stations, including retarded bombs, general-purpose bombs, incendiary and Rockeye II cluster bombs, combined effects munitions, Maverick missiles and laser-guided/electro-optically guided bombs; infrared countermeasure flares; electronic countermeasure chaff; jammer pods; rockets; illumination flares and AIM-9 Sidewinder missiles.

Key features of A-10 Warthog include:

- ✈ Two campaign styles
- ✈ Single missions
- ✈ Training missions
- ✈ Instant Action
- ✈ Advanced graphic engine
- ✈ Multi-player up to eight players
- ✈ Visual and audio cues



Jane's A-10
Warthog

Electronic Arts
1450 Fashion Island Blvd.
San Mateo, CA 94404-2064
Internet: <http://www.janes.ea.com>.
Spring 1999



For those of you who aren't familiar with the term, NOTAMS is an acronym for **NOT**ices to **AirMen**. The U.S. Government issues NOTAMS regularly. This issue of *Full Throttle* includes our version of NOTAMS — an expanded new products section. It's a regular part of our magazine. The products listed are compiled from press releases and information provided by the respective authors and companies who supply the products. We've taken steps to verify the information with each author or company, but cannot be responsible for inaccurate features, specification or availability dates.

Pacific Theatre

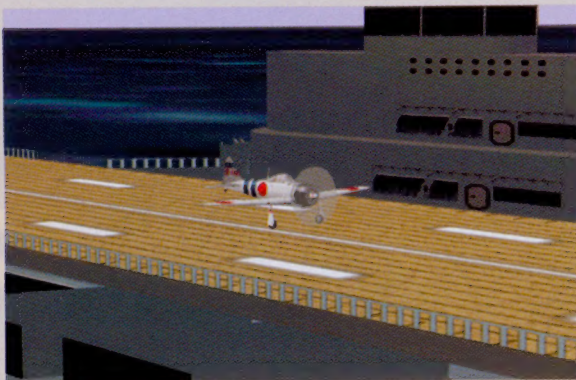
Aircraft, Scenery and Missions

No one can deny that Microsoft's Combat Flight Simulator package is extremely fun and flexible. That flexibility accepts custom tools, planes, sceneries, etc., like no other combat package on the market.

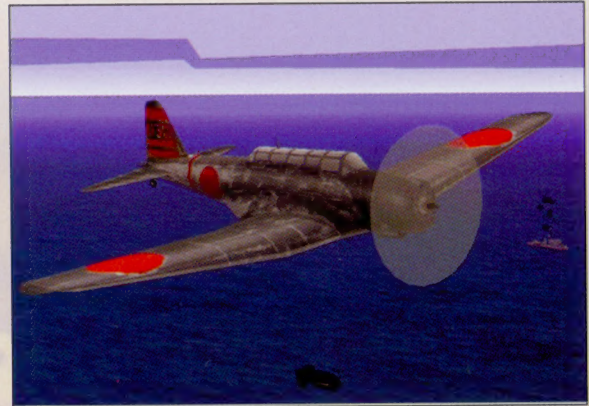
With that in mind, Abacus introduces an exciting new package to let you relive WWII's Pacific Theatre.

Pacific Theatre brings you twelve of the most famous U.S. and Japanese planes that saw battle in the Pacific:

- ✈ Curtiss SB2C-3 Helldiver
- ✈ Grumman TBF-1 Avenger
- ✈ Grumman F6F-5 Hellcat
- ✈ P47D Thunderbolt
- ✈ Bell P-39Q Airacobra
- ✈ Curtiss P-40N War Hawk
- ✈ Mitsubishi A6M2 "Zeke"
- ✈ Mitsubishi A6M5 "Zero"



For the first time in Combat Flight Simulator, Pacific Theatre brings you World War II aircraft carriers.



The Nakajima B5N2 "Kate" is one of the aircraft in Pacific Theatre

- ✈ Nakajima Ki-84 Hayate "Frank"
- ✈ Nakajima B5N2 "Kate"
- ✈ Mitsubishi J2M3 Raiden "Jack"
- ✈ Kawasaki Ki-61 Hien "Tony"

Plus

- ✈ Custom Pearl Harbor Scenery
- ✈ Custom missions to accurately relive the Pearl Harbor attack
- ✈ All new Abacus exclusive, Custom Damage objects that explode like the default CFS objects.

Objects include:

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- ✈ Custom Battleships
- ✈ Hangars, buildings and more!

Pacific Theatre

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They also show all the navigation and communication frequencies required for the approach. Most modern flight simulation programs are so accurate you can use the real-world plates to fly the approaches.

The problem is cost.

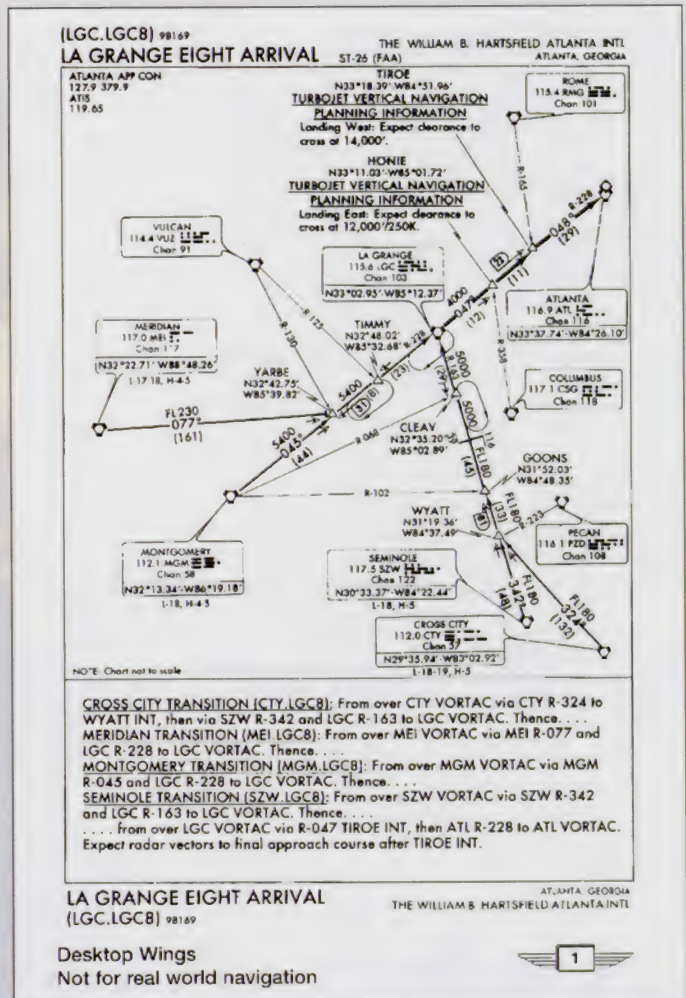
Desktop Wings has compiled two volumes addressing Class "B" airport approach plates.

Eastern United States (420 pages) covers 18 airports, and Western States (438 pages) covers 15 airports.

The two collections of approach plates are on 5 5/8 by 8 1/2 inch pages, prepunched for a three-ring binder. The pages are designed to fit into the binder that comes with AETI's ProFlight 98. Desktop wings also offers an optional separate binder.

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Air Command

Joe Jaworski
Internet: <http://www.joejaworski.com>
E-mail: joe@joejaworski.com
Shareware: \$24.00

MegaScenery DownUnder - Victoria

Victoria, Australia Scenery

MegaScenery Victoria puts you up above the picturesque state of Victoria, Australia and above the modern and cosmopolitan city of Melbourne.

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- ✦ 78 instrument approach charts
- ✦ 98-page manual

Mega Scenery Downunder -Victoria

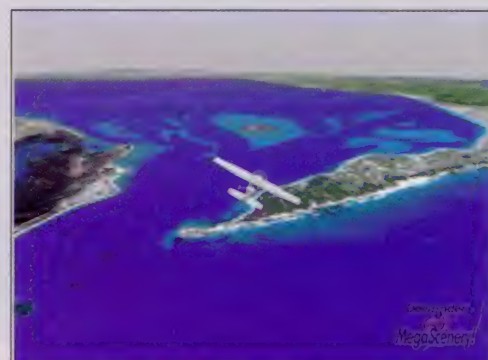
The PC Aviator Pty Ltd.
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Int'l Fax: +61 +3 +9532 8916
E-mail: crew@pcaviator.com.au
Internet: <http://www.pcaviator.com.au>

MegaScenery DownUnder - Victoria is also fully compatible with Microsoft Combat Simulator. For example, you can soar over downtown Melbourne with Microsoft Combat Simulator.



Flying over the top of Mt Beauty with its grass strip and the Kiewa River clearly visible. Down the valley and to the left is the highway to Bright township cutting through the mountains.

The inlet to Melbourne's Port Philip bay is a narrow shipping channel. Mud Island lies right ahead and Victoria's spectacular surf beaches near Sorrento are just below the aircraft.



Land your own Qantas 747 at Melbourne's International Airport recreated in intricate detail complete with terminal buildings and carparks.



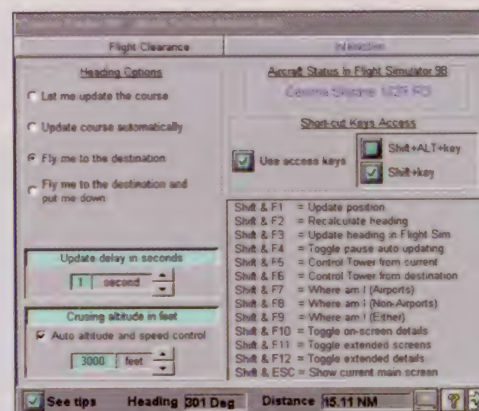
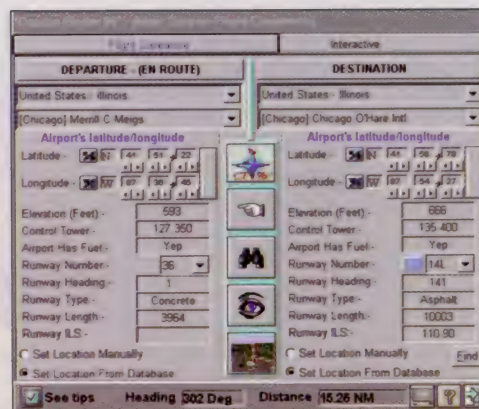
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Navigational System for FS 98

Course Finder 98 allows you to navigate your way around the FS98 virtual world with ease. Select your destination (even which runway you want) and CF98 shows you the way. Find the nearest twenty-five locations (airport or non-airport) to your current position.

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- ✦ Pinpoints your position in relation to other airports or cities/towns in Flight Simulator 98.
- ✦ Search for destinations based on complex criteria, like an airport that has refueling capabilities.
- ✦ Enables a "Fly-past" external view, similar to that available in Flight Unlimited versions 1 and 2.



Course Finder 98

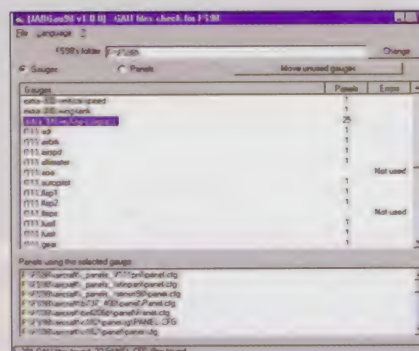
Lovette Software
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JABGau98

Gauge cleanup utility

JABGau98 is another clever utility to track down unused gauges and regain valuable hard drive space. JABGau98 reads all gauges (*.GAU files) and panels (PANEL.CFG files) in FS98. It displays which gauges are used by each panel.

It also allows you to move unused gauges to a sub-folder in the FS98's GAUGES folder and searches your panels to discover which gauges are missing.



JABGau98

Written by Jacky Brouze

Download:

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<http://www.flight-sim.iup.edu/files/uploads/jabgau98.zip>
(program only)

E-mail: brouzej@vtx.ch

Freeware

Flight Simulator Information Manuals Training Associates

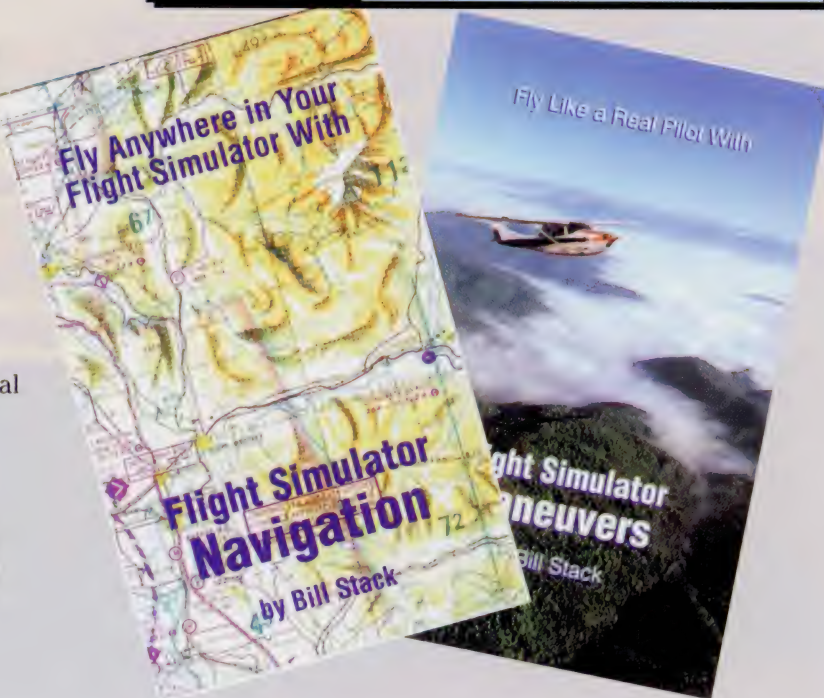
Training Associates has developed an extensive line of information manuals designed for flight simmers. The various titles offered by Training Associates offer real-world advice and information, such as:

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Aircraft Factory 99

Abacus is pleased to announce release of the long awaited and improved Aircraft Factory. Aircraft Factory 99 is a newly designed revision of the original program developed by legendary aircraft designer Laemming Wheeler, which was included in BAO's Flight Shop. Aircraft Factory 99 includes many features that bypass earlier limitations on the design of FS aircraft!

Features include:

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Aircraft Factory 99

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Update on Joe Rush Sierra/Dynamix Lead Quality Analyst

Sierra/Dynamix Lead Quality Analyst for Pro Pilot 99, Joe Rush, is currently working on his Private Pilot Certificate. Joe soloed September 15, 1998 in Cessna N67818, a model 152 owned by Lawrence Air Services in Eugene, Oregon.

Joe previously lived in California before moving to Eugene to pursue a career in software development. Joe credits his father for "Teaching me all that I know about computers" Joe's grandfather was a Multi-Engine Instrument rated pilot that instilled in him a love for aviation in his early years. Joe states, "I felt that it was necessary for me to get my Private Pilot certificate so that I would fully understand as much as I can about the

real flight experience." He adds "For me to be the best I can at evaluating Pro Pilots future releases, I must know exactly what it feels like in the pilots seat."

Joe was also responsible for hiring on two flight instructors and one active pilot on the Pro Pilot team. Many of the screenshots and reviews that you have found in Full Throttle have been possible with the assistance of Joe Rush. Full Throttle wishes Joe Rush good luck and blue skies as he pursues his dream and commitment to Pro Pilot.



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Exploding Objects in Microsoft Combat Flight Simulator

By Konstantin Kukushkin

Microsoft Combat Flight Simulator (CFS) offers many new features over FS98, its civilian predecessor. The most important difference is that you can now shoot and destroy things, on the ground and in the air.

In this article, I will look behind the scenes of CFS to explore the exploding ground objects. We will see how mission files, object libraries and damage profiles work, and we will explore the limits of exploding objects in CFS. Finally, I will show you how to create custom 3-D objects you can use in mission files.

As I write this article, I am still working on an easy-to-use converter for such objects. Thus, my description of how such conversions work may not be entirely accurate, but the basic principles will remain the same. I hope that bringing this article to you sooner rather than later will justify these small inaccuracies.

Mission files and objects

After completing my first CFS mission, I shot at several trees on the final approach. The trees disintegrated, exactly as they should in a combat sim. I decided to relax by just flying and shooting around. Instead of selecting another mission, I entered the free flight mode, loaded my aircraft with weapons and expected to have a lot of fun. To my disappointment, I didn't find anything to shoot at! All the buildings at the airfield were gone, and the ground outside was deserted as well. I managed to find a few big buildings in the scenery, but my bullets went through them as if they were holograms. I learned an important lesson: Military pilots don't shoot when off duty.

While I was disappointed as a user, I could accept this behavior. CFS inherited the scenery engine of FS98, with improvements like more realistic terrain. The scenery, stored in .BGL files, is static. There is no way to add objects that would explode and disappear when you shoot at them to scenery files. For this reason, exploding objects in CFS are specified in mission files, and appear only when

you are flying a mission. In the free flight mode, no mission file is loaded. This is why I had to return to the airfield with the full load of ammo.

A mission file contains many different sorts of information. It has general information about the mission, such as the mission description, which aircraft are allowed and the weather conditions. It contains waypoints and aircraft formations. But the biggest part of a mission file is the definitions of units. In CFS, units are all objects that can shoot and/or be destroyed. This includes the player aircraft and other aircraft in the formation, enemy aircraft and ground targets, and often a few "irrelevant" ground objects, such as trees or buildings at friendly airfields. We will call ground objects defined in a mission file "mission objects," to avoid confusion with ground objects in the scenery that you can't destroy.

Many types of units are possible in CFS. In mission files, they are referred to by easily understandable names (at least in most cases). For aircraft, you would simply use the aircraft name as it appears in the aircraft menu. For ground objects that came with CFS, you would use short names, such as "BrAmb" for a British ambulance car, or "TrLoco" for a locomotive in a train.

For ground objects that don't move, such as hangars, some vehicles or Me-262 aircraft (which, I suppose, were still in development at the time CFS missions take place), you supply ground coordinates for the object. This is very similar to placing macros into scenery files. The object will appear at these coordinates, exactly like a static object in a scenery file. But unlike a static object, it will sustain damage if you shoot at it, and will explode and disappear when no lifepoints are left. Ground objects that do move, such as ships or trains, are defined as formations, very similar to aircraft formations.

Exploding Objects In CFS

Object libraries

As we just learned, the only way to add objects that can be destroyed to the scenery is by placing them into mission files and playing these missions. But a mission file contains only names of objects. In order to display a mission object, CFS needs to know its appearance, defined in the 3-D model. Where does this come from?

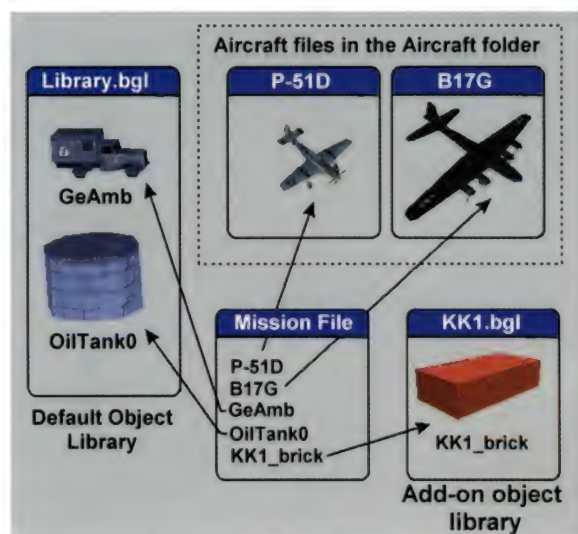
First, you can use the aircraft installed into CFS, in the Aircraft folder. You would just supply the aircraft name, as it appears in the Aircraft menu. For example, if you also have FS98 and want to go hunting drug dealers over Florida, you could copy the Cessna aircraft from FS98 into CFS and specify the drug dealers' aircraft as "Cessna Skylane 182R RG."

Normally, you would use aircraft files for your formation and for enemies in the sky. But, at least theoretically, you can also use them for your ground objects. Thanks to the efforts of talented FSFS designers, now many ground objects are in the "aircraft" format, including fire trucks, control towers or boats.

However, if your missions have dozens of ground objects, using aircraft files for them becomes very impractical. When selecting aircraft for flying, you would have difficulties finding the real ones among all the buildings, ground vehicles, radar antennas and munitions depots! This is why CFS uses a different approach for all non-flying objects: object libraries.

Many advanced users have noticed the `LIBRARY.BGL` file in the main Scenery directory of CFS. As the name suggests, this file contains a library of objects that can be used in missions. 3-D models for all ground objects used in default and many add-on CFS missions come from this file, with the exception of a few that are hard-coded into CFS. `LIBRARY.BGL` contains over 200 different objects. Many of them are general-purpose objects that can be used in every mission, such as ground vehicles, buildings, ships, train locomotive and cars, and grounded aircraft. Some objects that are called directly from scenery files cannot be destroyed. For example, I was very surprised to find the Eiffel tower in `LIBRARY.BGL`.

Sometimes you will want to add objects to your missions that are not included in the default library. Fortunately, CFS allows adding other object libraries with new objects. Such libraries have the same format and capabilities as `LIBRARY.BGL`. I will discuss creating libraries in more detail later in this article.



Mission files and object libraries

Let's take a closer look inside an object library. As the file extension suggests, this is a special `.BGL` file. A `.BGL` file is used to store various scenery information, such as the visual scenery, ground elevation, nav aids, magnetic deviation, etc. Specific kinds of information are grouped into "sections." Object libraries are located in section No. 10.

The `.BGL` section 10 was first introduced in FS98, where it was used to store 3-D models of dynamic objects. Long numbers identified objects in the library. In CFS, Microsoft has changed the format of section 10. Library objects now have easy-to-use names. With these names, they can be used in mission files. Because of a different format, CFS object libraries are not compatible with those used in FS98.

Damage profiles

The first custom object I created and placed into an object library was a big, red brick. It looked great for the first object. The only problem was, it could be destroyed with just one shot. Obviously, I had to tell CFS just how difficult my object should be to destroy.

CFS displays objects using 3-D models, either from object libraries or the `.MDL` files that come with aircraft. But CFS is unable to determine from the 3-D model how hard it should be to destroy the object. In fact, even people cannot always tell this. Thus, this information has to come from an additional source: a damage profile. Damage profiles are used for both aircraft and ground objects.

Damage profiles for library objects are stored in `*.DP` files in the `Objects_dp` folder in CFS. The name of the `.DP` file should be the same as the name of the object it applies to. For example, for a "nuclear_plant" object, the damage profile should be named `NUCLEAR_PLANT.DP`.

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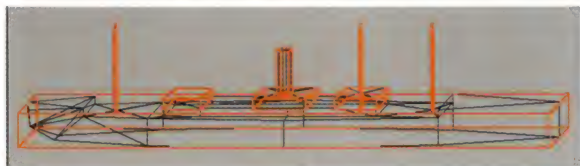


FOR MICROSOFT FLIGHT SIMULATOR 98

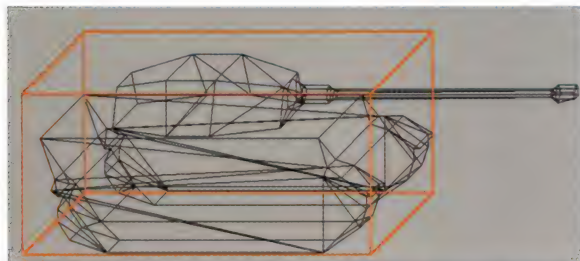
Exploding Objects In CFS

To see how damage profiles work, let's follow a bullet after it leaves your gun. In the real world, it would fly along its trajectory until it hit something. In a simulator, taking frequent "snapshots" of an object's position simulates motion. CFS calculates the new position of the bullet several dozen times a second. After taking a snapshot, CFS has to decide whether the bullet has hit an object.

Each damage profile defines one or more damage boxes. The bullet hits an object if it enters one of the damage boxes defined in its damage profile. Since not every 3-D model consists of only rectangular boxes, the damage boxes normally resemble only an approximated shape of the object. For many small objects, a single damage box enclosing the object is sufficient.



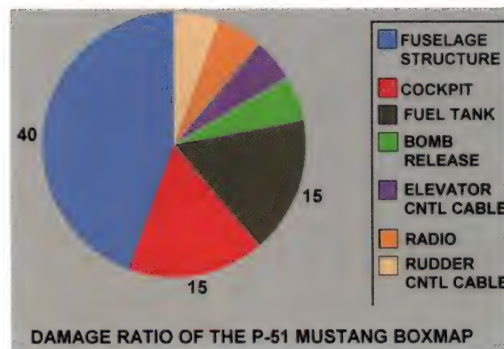
Damage boxes for a merchant ship from library.bgl



Damage box for the Tiger armor from library.bgl

After CFS has determined which damage box has been hit, it determines what damage has occurred. The damage profile for an object defines one or more systems. For example, a truck could have "fuel tank" and "the_rest" systems. The fuel tank would immediately explode and destroy the truck when hit, while "the_rest" would be very resistant to damage.

Each system can be individually damaged. Each damage box has a corresponding boxmap, which determines the probabilities of damage to individual systems when the damage box is hit. For example, when the bullet hits the "fuselage" box of a P-51D, the fuselage structure will be damaged by 40% of all hits, the cockpit or the fuel tank would be damaged by 15% of all hits each, and various other systems will receive damage on rare occasions.



Boxmap for the P-51D fuselage

For many simple objects, it is sufficient to define just one system, which will represent the whole object. For example, for an oil tank, you could just define an "OilTank" system. After receiving sufficient damage, it would explode.

Each system has a certain amount of lifepoints at the beginning. The more lifepoints it has, the more difficult it is to damage the system. From the other side, the amount of lifepoints one hit depletes is determined by the strength of the aircraft weapons.

The damage profile also defines effects, which determine what happens after systems receive a certain amount of damage. In the oil tank example above, you would set it to emit smoke when the damage level reaches 20%, and explode when it becomes 100%.

Finally, damage profiles also store detailed information about the guns an object can have.

Exploding scenery

As we saw earlier, it is impossible to simply add exploding objects to scenery files. But you can add objects to mission files. When flying a mission, these objects will appear exactly like objects in the scenery. But in order to have realistic scenery, you would need many hundreds, if not thousands, of objects.

Here, we are confronted with one significant limitation in CFS. By their internal structure, mission files (*.MIS) are Windows .INI files. Such files were used in old versions of Windows to store settings for programs, and many Windows 95 programs still use them. Since these files would normally be very small, Windows 95 can only properly handle .INI files that are no larger than 64K. Because CFS accesses mission files with the standard Windows methods, this limits the length of a mission file to 64K.

How many objects can fit into a 64K mission file? Assuming the rest of the mission file is not too sophisticated and the mission description is short enough, this number varies between 300 and 200, depending on how many different object types you use. These numbers are valid for mission files in the format produced by the Excel-based mission editor from Microsoft.



With some optimizations in mission files, it is possible to increase these numbers by about 15%. I am looking into ways to remove the 64K limitation by supplying CFS with alternate means to access mission files, but as I am writing this, I do not know if these attempts will be successful.

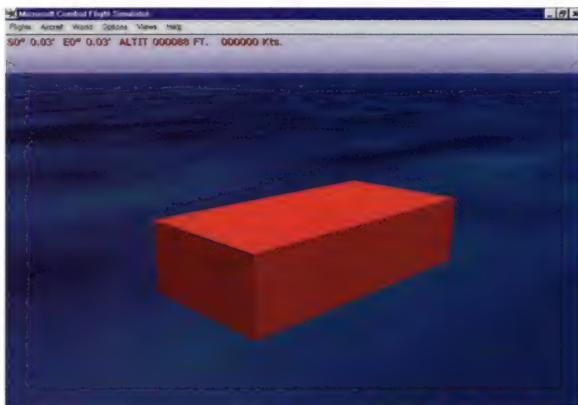
In most cases, 200-300 objects are sufficient for placement along the mission path. After all, with realistic settings in CFS, you would run out of ammo long before you could destroy all of them. But a dense "exploding scenery" covering a large area would require thousands of mission objects, and this is something CFS can't presently support. Let's hope this will change in the future.

How I made my first mission object

I am working on a tool that will allow you to easily create your own object libraries using static macros. Here, I will discuss the basic principles of creating such libraries.

The first thing you need for an object library is, obviously, objects. The first choice is static macros. Many people can write them, and many macros are already around. It is also possible to convert FSFS aircraft, which can be useful for objects in aircraft format that are not real aircraft, such as fire trucks or boats. For each macro you want to convert into a CFS library object, you will need to create a scenery file containing that macro and nothing else.

The first object I converted for use in CFS was a big, red brick. I quickly wrote a macro for the SCASM scenery compiler, and placed the object into a scenery file at N0:E0 coordinates in a North-oriented fashion. This format is used for importing macros into the DynKit utility, and my CFS library tool will use it as well.



A static brick

For my first object, I had to use much less comfortable tools than the ones you will have. I first imported the .BGL file with the object into DynKit and made an FS98 dynamic library with it. Then, I had to hex edit this .BGL file to convert it into the CFS library format. At the end, I named the dynamic library KK1.BGL and the object in it "kk1_brick."

With my converter, this process will be much easier. You will simply drag-and-drop the .BGL file into the object library, similar to the way it is done in my DynKit program.

I placed KK1.BGL into the main Scenery folder of CFS and added a "kk1_brick" object to a mission file. It worked, but a single shot was sufficient to destroy the brick. This is the default behavior of CFS if no damage profile has been specified. In order to make the brick more damage-resistant, I created a simple .DP file. I created a single damage box around the brick and a single system called "kk1_brick" with 600 lifepoints. Finally, I added the "bomb" effect when the damage to the brick reaches 100%. Now, I had to shoot several times and got a big explosion at the end.



Custom object exploding

A few more tips for creating your own object libraries

Because the .DP files for all objects in all libraries must reside in the same folder, there is a potential for name conflicts. For example, two different object libraries could have an object called "truck." This would create problems in mission files, because there is no way to refer to an object from a particular library. Therefore, you should try to use unique names for your objects, for example, by appending the object name to the library name, like I did in the example.

The textures used by library objects should be copied into the main Texture folder of CFS. Therefore, you should also try to name your textures so that no name conflicts would occur.

You should normally specify a "bomb" or a "break" effect for at least one system. Otherwise, the object will not be destroyed even if you inflict 100% damage on all systems.

I hope this article was informative and useful for you. Using custom objects in mission files will make CFS missions even more realistic and allow a wider range of missions.



The FAA says that the PIC (Pilot in control) is ultimately responsible for and in charge of the operations of an aircraft. That is true, but only to a point.

If you really want to know who is in control, try pushing your weight around when inside class airspace.

Oh sure, you can hot dog around and intimidate some of the other fellows at the local patch, but you better be ready to answer serious questions and fill out a ton of paper work if you push it too far in controlled airspace.

Who Is In Control: A Day In The Tower

**By
Jim Rhoads**

Working with Air Traffic Controllers is something that you are going to have to do if you will be doing any serious flying, and it does not have to be as intimidating as it may seem. It's the same deal as when I was a kid—my parents and teachers used to say that the policemen were my friends. And you know, they really are, as long as you are behaving and trying to do right.

In the same way, Air Traffic Controllers are there to help you and keep the sky safe. It's their job (and yours) to act responsibly and uphold the standard of conformity that keeps aviation the number one safest mode of travel.

Who are these Air Traffic Controllers, and why would one consider an occupation such as this?

Hoping to answer these questions, I scheduled an appointment to visit the Fort Wayne International Tower. Fort Wayne Airport (FWA) is located

A Day In The Control Tower

approximately 50 statute miles east of where I live, and I frequently enter their airspace.

Fort Wayne ATCT (Air Traffic Control Tower) is a Level 3 Combined Tower and Radar Approach Control Facility with class "C" airspace. Fort Wayne Approach handles traffic from the surface up to and including 10,000 feet.

To enter class "C" airspace, you must have two-way radio communications with an acknowledgment of radio contact. In addition, the aircraft must be equipped with a mode "C" transponder.

Tower

Saddling up the trusty Cherokee, I headed to Fort Wayne International to be greeted by Kevin Frye, the Tower Operations Manager. After being familiarized with the important things, such as the coffeepot and break room, we progressed up to the tower. The Fort Wayne Tower is approximately 100 feet tall and is located at the northwest area of the airport. The view from the tower was unobstructed with a good overall view of the field, as I expected. Luckily for me and strangely enough, a friend of mine was taxiing from one of the FBOs on field. Of course, any of you that know me would never assume that I would have a little fun with a situation like that...

Fort Wayne International has a medium traffic load that services around 350 to 500 aircraft per day, mostly corporate to commercial sized aircraft. Also services for American Eagle, Comair, Northwest, US Air, Continental, United, Transworld and American Trans Air arrive and depart FWA daily.

The atmosphere in the tower was more comfortable and a lot more relaxed than I had envisioned. Ground operations are the primary function of the staff operating the "Crow's Nest." Although this may sound easy enough, keeping track of everyone on the ground and keeping the flow and order going is a large responsibility, and I am sure it's an acquired art. Tower operators write down all aircraft information on individual "strips." Once the aircraft are



airborne and handed off to departure, the operators drop the strip down a tube, where it is received by the departure personnel in the bottom floor of the tower in the TRACON room. The controllers also have a system that displays all types of available information, such as Metar, a plain-language Metar converter (hey, I thought they were supposed to understand that, too), Pireps, emergency procedures for in-flight, bomb threats, all local frequencies and a plethora of other vital information.

TRACON Room

TRACON stands for Terminal Radar Approach Control. FWA's TRACON is a fully digitized unit that has been in service approximately five years. Kevin informed me that the older unit it replaced relied on very large CRT displays that were only obtainable from a source in the Middle East at a cost of \$4,000.00 each, and replacement schedules were based on replacing two every week!

Entering the TRACON room gave me the feeling of walking into the radar room of a submarine or navy vessel and made me reminisce some of the old movies I have seen of an operator sitting in a dark room with a large screen and a sweeping image. The room was very dark and contained five or six of the units, with each controlling a certain sector of the airspace.

The operator tags each aircraft with its "N" number, and the display shows the airspeed and altitude as it tracks across the screen leaving a "phosphorous trail" that is used to identify the track of the plane. On the outside perimeter of the screen is a large compass rose with fixed magnetic headings for vectoring traffic. I had been expecting a much more complex system that told me which way the traffic was heading digitally, and had the airports within the underlying airspace tagged with identifiers. I asked Kevin how he knew where each

Who Is In Control?

On The Side...

After spending the afternoon touring the tower and facilities, I sat down with Kevin to ask a few questions about working in the tower.

Full Throttle: *What are some of the most common mistakes made by pilots?*

Kevin: I think the biggest mistake is that they are afraid to ask when they do not understand something. It comes down to communication. If I am not communicating with you properly, you are not going to do what I am asking of you, and vice versa. As the saying goes, the only stupid question is the one that is not asked.

FT: *What is your most memorable close call?*

Kevin: Probably, it occurred when I was stationed in Mansfield, Ohio. I had a person coming in that was really iced up, he could not even see through the windshield, and I had to guide him in. He was so iced up that he could not even tell when he was over the threshold, but he did manage to land it.

When we have any kind of close call, they are referred to as "operational errors." Actually, errors are somewhat up around the country, as is traffic. However, this facility has not had an operational error in 17 months and has worked around 230,000 aircraft in that period.



FT: *How many of the controllers are active pilots?*

Kevin: Out of a staff of twenty-eight controllers, I believe we have around eight that are currently active pilots.

FT: *In terms of recurrent training, what are the benefits of getting additional training, other than being more proficient at your job?*

Kevin: First and foremost as you said, it helps keep a controller more proficient.

You do get credit for taking the extra courses, and they add as points if you are bidding on another job. So, there is probably not a big incentive to take them, but it does tell you a lot about the controller.

FT: *What are the requirements to maintain proficiency?*

Kevin: Controllers have to get eight hours in each specialized area: eight hours in the tower and eight hours in the TRACON.

FT: *Job hours? Typical routine?*

Kevin: Eight hours a day, five days a week, two days off on a rotating schedule. The typical routine involves coming in at two o'clock your first day back and checking the red book, which gives a current briefing of the facility to make you aware of any changes that have occurred since you left.

airport was, and when to tell an aircraft to turn and to what heading. He just smiled and said, "Experience." Handing off an aircraft to the next approach facility is done by a button that makes the image blink, alerting the controller at the adjacent facility to pick him up. If this is not done in a timely fashion, a hotline phone may be used to contact the controller directly.

One of the safety features I found comforting as a pilot is that when two aircraft converge closely, an audible alarm goes off, alerting all controllers of a conflicting situation.



A Day In The Control Tower

FT: What are the differences between working in a small, medium or large airfield?

Kevin: At a smaller airport like Muncie (MIE), which is a class "D" airspace, you will work in the tower only. However, with a facility like ours, which is radar and tower, you have to rotate positions. A larger airport like Chicago O'Hare has split facilities. You either work in the tower or you work in the TRACON.

FT: I know that at least one of your controllers, Karl, is an active flight simmer who keeps current with the hobby. Are there any other controllers that you know of that use flight simulation programs?

Kevin: I think that almost all of the controllers use some type of flight simulation program on their personal computers. Moreover, some are very active.

FT: In keeping with that thought, do you believe that flight simulation can offer advantages to pilots?

Kevin: I am sure it can. I am sure that it can keep you proficient much like we do when we conduct monthly briefings and recurrent training. For instance, doing something that you have not thought about for awhile can be awkward. Then throw in an emergency and have an engine go out. What do you do with that? That is something that you don't do all of the time, and if you provide an atmosphere that allows you to practice it, you are going to know what to do.

FT: Any differences tracking aircraft at night?

Kevin: No, not for us. However, for the pilot it can be different. Depth perception, for example. It is hard to follow people on final sometimes at night.

FT: Why would anyone want your job?

Kevin: I have no idea [grinning] No, actually, it is a lot of fun. If you get to come in and do what you enjoy, it makes it all worthwhile. Good pay. Good benefits.

As long as I have been in this, it is still amazing to me that airplanes fly. I totally understand the principles of flight, but it still amazes me.

FT: How long does the average ATC career last?

Kevin: Well, I don't know. We are able to retire, depending on one's service, at around 25 years.

I think most people that become controllers stay controllers. You do not find a lot of them that just get into it and then get out of it. The benefits are too good, the hours are good, and you're not out there pounding the streets. I believe that most controllers really love their jobs. Moreover, by the time they reach a facility like this, they have already weeded out those who should not be here or do not want to be here.

FT: So, do you think some of the myths such as high pressure, high incidents of suicide, etc., are just that, myths?

Kevin: Yes, I believe they are myths made up by the press, etc. Sure, there is stress sometimes, but you are going to find that almost anywhere or in any job that you take. Across the board, I believe most controllers are good, professional people.

Controllers must take recurrent, mandatory training to maintain proficiency, and many other programs are available and encouraged as well. Most of the training is done at the tower. For instance, in winter, training may focus on icing conditions. In spring, turbulence and thunderstorm avoidance training. Every month has a different briefing package assignment. The National Transportation Safety Board's recreation tapes of major air disasters are also available, so that the controllers can study and learn how to handle similar situations.

How does it all work?

How do these separate facets of this complex web work together with so few problems?

How does it work? A typical scenario begins like this:

The aircraft will call FWA clearance delivery to confirm his requests and initialize his flight plan as filed. Then he will contact Ground and make his request to taxi for his departure.

When the pilot is short of the runway or as instructed, Ground will instruct him to contact the Tower.

FWA Tower will clear an aircraft for take-off, and once airborne, the pilot will change frequencies to the Departure controller.

Who Is In Control?

Assuming there are no departure routes or procedures to follow and that no other aircraft are above the departing aircraft, the Departure controller will give the aircraft instructions to climb to its requested altitude or the top of his airspace, and then clear the aircraft on course.

The Departure controller is responsible for separating the aircraft from all other IFR and VFR aircraft in his airspace. Once the aircraft approaches either the top of the controller's airspace or the lateral limits of his airspace, the controller will hand-off the aircraft to the Air Route Traffic Control Center that is responsible for the above or adjacent airspace.

Once handed off, the aircraft is being controlled by a Low Sector controller, and will still climb to his final altitude. This controller is also responsible for separation from other aircraft.

When the aircraft approaches the top of the Low Sector's airspace, the controller will hand-off the aircraft to the High Sector controller until reaching final altitude and handed off from one High Sector to the next until it reaches its destination.

Once the aircraft has been cleared for descent, the process reverses, from High Sector to Low Sector to the Approach Control. Once the aircraft is established on the approach, he will be instructed to contact the control tower for final sequencing.

Functions

Clearance Delivery

The Clearance Delivery controller issues IFR clearances. Clearance Delivery issues routing, climb instructions, what altitudes to expect, departure frequencies, transponder codes and other important information.

Ground Control

The Ground controller is responsible for both aircraft and vehicles operating on the airport movement area. Ground control issues taxi instructions, crossing instructions/approval, and coordinates the use of runways with the local controller.

Tower

The Tower facility is responsible for aircraft on and in the immediate vicinity of the airport. The controllers are responsible for the safe and expeditious flow of aircraft from the time they leave parking until they get to the runway, and into the air. The control tower is responsible for both IFR and VFR, aircraft, whether landing at the airport or transitioning the Tower's airspace.

Local Control

The Local controller is responsible for aircraft operations on the runways, issues take off and landing clearances and are responsible for departures/arrivals. The local controller insures that minimum separation standards / wake turbulence separation standards are applied to aircraft arriving or departing.

Flight Data

The Flight Data controller is the central point for coordination. He is responsible for tracking arrival/departure times, coordinating releases of aircraft and all other information.

I really want to thank Fort Wayne Tower Operations for allowing me to spend the afternoon with them and see exactly what it is like on the other side of the fence. FWA Tower seemed to be a well organized (thank goodness) group of individuals that when combined, make a highly skilled staff that seems quite capable of doing their job and loving it as well. Flying home in the Cherokee, I had a different perspective on how it all works and a satisfying feeling knowing that I was being carefully watched. All in all, I could only add one bit of advice. Kevin, you have to do something about that break room coffee.

For more information on the Fort Wayne tower facilities, visit fwa.natca.net on the Internet.

N140HC squawking VFR. Good Day.

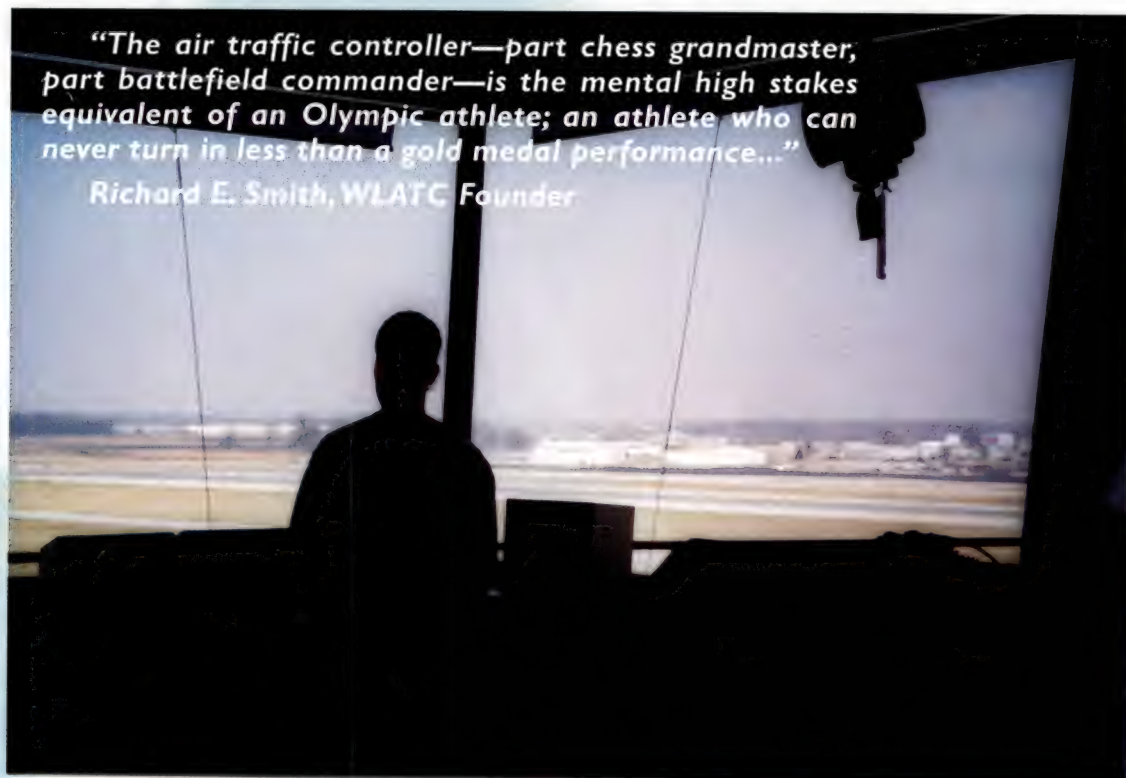
Jim Rhoads



A Day In The Control Tower

The following table lists several common acronyms you'll hear in and around the control tower of a large U.S. airport.

ADR	Automated Demand Resolution	FCA/PCA	Functional Configuration Audit/Physical Configuration Audit
ARTCC/ACF	Air Route Traffic Control Centers / Area Control Facilities	IPC	Intermittent Positive Control
ARTS	Automated Radar Tracking System	M/A	Monitor Alert
ARTS-III	Automated Radar Tracking System - III	Mode S	Mode Select Beacon System
ATARS	Automatic Traffic Advisory and Resolution and Service	MSAW	Minimum Safe Altitude Warning
ATAS	Airspace and Traffic Advisory Service	NAS	National Airspace System
ATC	Air Traffic Control	NOTAMs	Notices to Airmen
ATCRBS	Air Traffic Control Radar Beacon System	OFL	Offline Adaptation Database
ATIS	Automated Terminal Information Service	PIREPS	Pilot Reports
ATMS	Advanced Traffic Management System	RAMS	Remote Monitoring System
CA	Conflict Alert	SAGE	Semi-Automatic Ground Environment
CWP	Central Weather Processor	TDLS	Tower Data Link Service
DABS	Discrete Address Beacon System	V/STOL	Vertical Short Take Off and Landing
DLP	Data Link Processor	WCP	Weather Communications Processor
ER	Electromagnetic Radiation	WD	Windshear Advisories
FAA	Federal Aviation Administration	WXA	Weather and Aeronautical



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How I Make Scenery

Part VIII: Putting It All Together

By Justin Tyme

Justin Tyme continues his series on scenery design. In this issue, Justin adds a few finishing details such as getting the project ready for distribution. This includes installation instructions, acknowledgments, and other information.

You'll need to create an Airport & Facilities Directory (a "road map" for your scenery). You also must tell your end-users how to get in touch for support questions or congratulations for a job well done.

It's hard to believe that more than a year has passed since this series began. Before we begin this last installment of this series, I'd like to acknowledge all the letters and e-mails I've received throughout the past year or so. I am heartened that these articles have been helpful to many, and I hope to continue to dispense useful advice and techniques in future articles.

A Final Edit

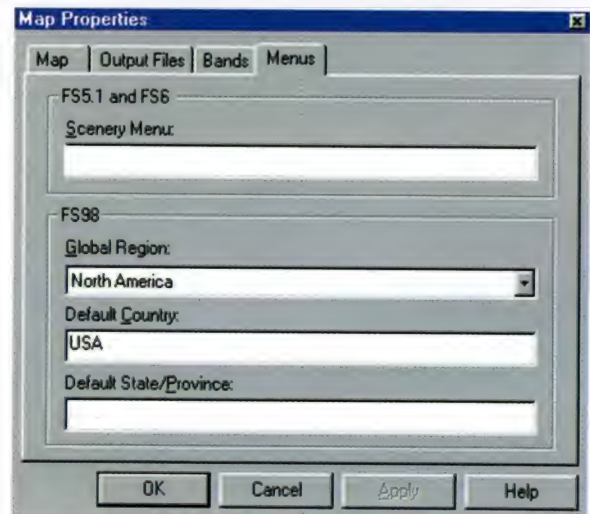
If you haven't already done so, open ASD and pull down the Edit menu. Choose Map Properties. Under the Menu tab, double-check the scenery area name, as you want it to appear in FS98's "FS6 and before" menu.

A Quick Review

We began laying the groundwork by setting up Airport & Scenery Designer (ASD), and creating our working directory and our batch files. Next we laid in our synthetic tiles and placed our airports, nav aids and communications frequencies. At that stage we also began our beta-testing program. Then we began to construct our man-made geographical features—cities, towns and villages, roads and highways, interchanges, and began to place bridges and other landmarks. After this we concentrated on making natural geographic features—land-use, rivers, lakes, streams, and mountains, and finally, enhanced our coastlines.

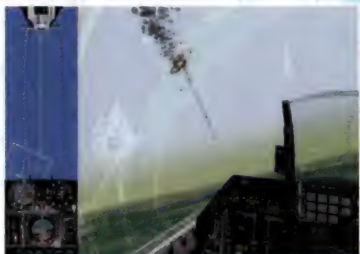
At this point we have fixed most of the bugs (can we ever get them all?!) and anomalies as a result of beta-tester feedback, tweaked and tuned, added a few finishing details, and the long gestation period is almost over. We are nearly ready to deliver the baby to our waiting public.

But we are not quite finished yet. We must gather our work and put it in a form suitable for distribution. This includes documentation in the form of simple and understandable installation instructions, acknowledgments, and any other information you may want your end-users to know. Also, we must create an Airport & Facilities Directory (a "road map" for your scenery), and tell your end-users how to get in touch for support questions or congratulations for a job well done.



Make sure to add a version number. For instance, if this is the first released version of your scenery, add "v. 1.0" to the end of the scenery name. Doing so will facilitate any future technical support questions or problems your end users may have. If you release a patch or update sometime in the future, always make sure to return to this menu and update your version number (to say "1.01," "1.1" or whatever) and include the updated menu .BGL in any future patch release. This way, if one of your end-users writes you in the future about a problem that may have already been fixed in a subsequent patch, you can direct them to the "FS6 and before" menu to see exactly what version they have. Now compile the menu file.

Technically, it's still a computer game.



It's the simulator of unparalleled realism, graphics, and intensity. You can control everything in the F-16. Every button, every switch, every aspect of flying the real thing. Falcon 4.0 simulates the most realistic flight model, avionics, and weapons systems available in any flight sim. Plus Tactical Engagement, the most extensive training system and mission builder ever made, featuring 30 training missions designed by F-16 pilots. And if that seems a little overwhelming, you can play in Instant Action mode, featuring a simplified flight model with unlimited ammo, fuel and enemies.

You don't need to look too hard for combat. Lots of combat. In fact, a war. Falcon 4.0 puts you in the middle of a completely real-time war campaign. Just like war, this campaign carries on while you plot your next move. It's multi-player compatible, so your pals might be dogfighting MIG 29's while you're bombing a nuclear power plant. You can also paint the skies of cyberspace with other online pilots in the Falcon 4.0 Dogfight.

Can you take on the ultimate in sim experiences? Falcon 4.0 is waiting. Computer aviation has never seen anything like this.

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Finishing Tools

We'll need several utilities to help us accomplish our task. First, we'll need WinZip or another file compression utility to package our files. Another useful, time-saving tool is Pete Dowson's BGLTXTS, available at most of the usual download sites. This command-line utility will search through your .BGL files and return a list of textures used. One of the more common mistakes designers make when gathering up their baby for distribution is the omission of necessary textures. BGLTXTS will help ensure that you don't omit any textures. We'll also need Notepad to write the documentation.

Optional tools would include the WinZip Self-Extractor, which can create self-extracting files, and, to add a professional touch, InstallShield Express. We can also use WordPad or Word to write the documentation if you prefer an editor with added features. ASD has a built-in Airport & Facilities Listing Tool that will create an adequate list of all airports, nav aids and communications frequencies included in your scenery.

Gathering your Textures

If we have been using the batch files we created in the beginning, all of our .BGL files are already in their final form within our working scenery directory. After downloading and installing BGLTXTS to our processing directory, click the Windows **Start** button, and select Run... Then type the command line for the BGLTXTS utility, for example:

```
BGLTXTS [path to your final .bgl files]\*.bgl >textures.txt
```



This tells BGLTXTS to find your .BGL files at the location you specify in the path, scan them, and create a text file named TEXTURES.TXT with a list of textures it finds. You can then open this text file, print it and check the textures in the .BGL files against the textures you have in your working texture directory. If you find any

missing textures, simply copy them to your working texture directory. Keep in mind, too, that you have probably used at least a few default textures that will already be on the hard drive of your end-user. You should not include these default textures in your distribution files, since we want to keep the distribution file's size to a minimum. Of course, if you have customized any of the default textures, you should give them a unique name so no default textures are inadvertently overwritten during installation.

Most sceneries use the three common textures sets from Airport 2x, VOD, and ASD. In most cases, these texture sets should not be included in your distribution files, since most users will already have them installed. For those end-users that do not, you should direct them to a download location in your documentation.

BGLTXTS will not pick up on seed textures that are used for synthetic tiles, so you will have to double-check these manually. Any issues regarding missing seed textures should have been resolved earlier in your beta testing, so at this stage let's assume they are all there. But in addition to this, it is important to instruct your end user to put any SEED*.R8 textures into the main FS texture directory, not in a local texture directory with your scenery. Otherwise, Flight Simulator will not be able to read them, and your end user will see plain colored polygons instead of textured ground!

Since these seed textures must reside in the main FS texture directory or they won't display, it's a good idea to keep them separate from the textures in your scenery's texture subfolder.

Now, if you don't like to assume things (and you shouldn't), another trick to ensure that you have included all your synthetic seed textures is to temporarily rename your main FS texture directory. Then copy the default main texture directory off the FS CD to your hard drive. Then simply slew around in FS and note any gray areas you encounter. Note the latitude/longitude position where they occur, go into ASD and find the offending tiles. Note the tile's texture and make sure to include it in your distribution files.

Next, copy all your textures (except SEED*.R8) to the texture subfolder of the folder where your scenery resides. So now we have all your scenery files in your scenery subfolder and all your non-seed textures in your texture subfolder. Now hold that thought; we'll come back to this later.

Airport & Facilities Listing

ASD has a handy built-in feature that will create a report called Airport & Facilities Listing. To access it, pull down the File menu and choose Reports. Click "Airport & Facilities Listing" and ASD will create a plain text file listing all the airports, nav aids and communication frequencies in your scenery. Copy the resulting file to the root folder of your scenery. You can also use this text file to create a more polished and professional document if you wish.

Writing the documentation

Documentation is an important element of your release. In it you will explain exactly what the package contains, the version number, installation instructions, acknowledgments, known issues, support information and your copyright. Optionally, you may also want to include a version history, a tour itinerary, highlights, future plans, and any other information you think your end users might be interested in regarding the creation, use and enjoyment of your efforts.

Format is not as important as content. You can use MSWord to create an attractive, polished, professional document. You can also create your document in HTML for viewing offline in a Web browser. Whatever you choose, you should also include a plain text version for those who prefer simplicity or who may not have the correct software to view your chosen primary format.

A good set of documentation will include:

Heading—At the top of your documentation, you should include the name of the scenery package, the version number, a brief copyright notice, your name and perhaps an e-mail address and/or Web site URL.

Installation Instructions—Realizing that we are not all Ernest Hemingway, matters of style are not so important as clarity and conciseness, especially in your installation instructions. Keep it simple, and don't assume knowledge on the part of your end-user. Obviously, many that download and install your product will have installed scenery many, many times before. But there will also be first-timers, newbies and those who don't understand the inner-workings of FS as well as others.

Thoroughness—Write your installation instructions from the point of view of someone who has never used a computer or FS98 before. It's better to over-explain than to leave questions in the minds of your installers. If you wish, you can include two different versions of your installation instructions. One, an "express" install procedure, for experienced users, and another "detailed" procedure that covers all the bases in detail for inexperienced users. But if you follow the WinZip procedures I'll explain later, your installation instructions are sure to be very easy for anyone.

How to install into the FS scenery library—Your installation instructions should include not only how and where to put the files, but also the step-by-step procedures for entering information in the Scenery Library. This is probably the one most daunting task for inexperienced installers, especially since Microsoft has seen to it that new users are alarmed by a warning message when entering the Scenery Library. The Scenery Library stage of the installation is the best place, too, to mention any important scenery area layering information. It's a good idea, also, to instruct your installers to first backup the `WORLD.VIS` file before attempting any changes to the Scenery Library, just in case something does go wrong.

Acknowledgments—While it is beyond the scope of this article to discuss the fine points of copyright violations, this is nevertheless a very important consideration. Recent accusations regarding a prominent European software company have once again brought

this subject to the fore. So, it is a good idea to be prudent in these matters. You don't need an attorney, or even to study any case law. Just a simple, common-sense approach should suffice. If you use something, a macro, an object, a texture, or anything that was made by someone else, you should first read the documentation that came with it. Unless explicit permission is granted in the documentation, you should make a reasonable effort to contact the author and ask permission to use it in your scenery. Very rarely will this permission be denied. Most authors will be happy and gratified, not to mention flattered, that someone wants to use their creation in their own. Once permission is obtained, the author should also receive an acknowledgment in your documentation as a courtesy.

It is also customary here to acknowledge any special help you may have received from someone in solving problems during your scenery's creation, beta testers, and your wife or girlfriend for putting up with your absence during your many long hours at the keyboard.

Here, too, is a good place to mention the authors/publishers of the design tools you used to create your scenery.

Known Issues—This is where you note any unresolved bugs, problems or other anomalies that you know about. You might also note any reasons you can think of for their existence. Obviously, it is preferable to work out these issues before release, but sometimes things are discovered at the last minute that you might want to mention. Minor issues can slide until the next patch or update, but if you discover any major issues, issues causing fatal exceptions, etc., at the last minute, it's best to delay release until they are worked out.

Support Information—You'll also want to include an e-mail address or Web site where your end-users can obtain support if needed. Product support can be a time-consuming effort, but many questions and problems can be nipped in the bud with two important prerequisites. Number one, an effective beta testing program to ferret out problems before release. And secondly, well-written documentation that anticipates many basic questions. Of course, there will always be those who don't read the documentation. But if you receive a question that has already been answered in your documentation, it's much easier to refer the questioner to that part of your documentation where the question is addressed, than to answer the same questions over and over again.

Copyright & Disclaimer—Finally, you should include a copyright notice and product disclaimer at the end of your document. You, as author, own all rights to your creation. You are the sole determiner of how it can be used and distributed and you should make your wishes known here. Your disclaimer should mention whether you offer any warranty, guarantee or take any responsibility for any problem that may result from the use of your product.

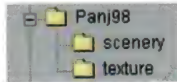
Finally, even and especially if you're not Hemingway, run your document through a spell-checker.

Now that you have completed your documentation in both fancy and plain text formats, copy the documents to the root folder of your scenery. We now have all documentation sitting in the root folder, all scenery files in the scenery subfolder, and texture files in the texture subfolder.



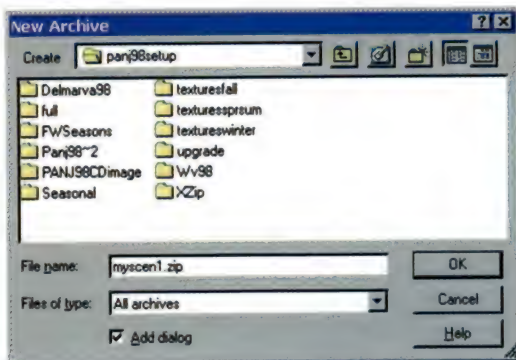
Putting it all together

Now we have your final package sitting on your hard drive, ready for packaging. Your folder structure looks something like this:

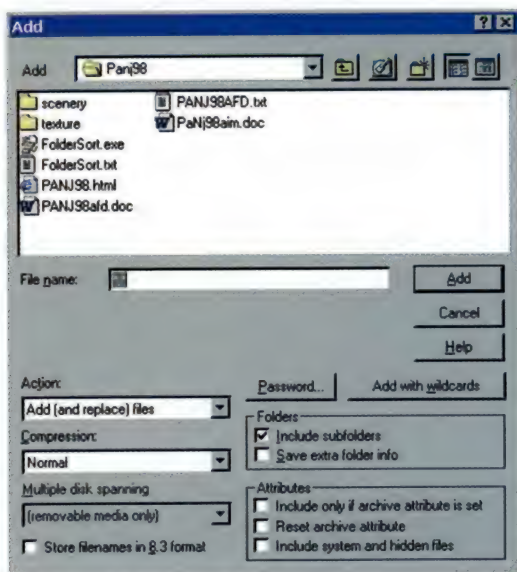


I prefer to use WinZip 7.x, and this article assumes its use. Other compression utilities can be used, but you should adjust the following to reflect procedures for using any other file compression utility that you might prefer.

Open WinZip 7.x and click the New button. The New Archive dialog box will pop up.



Name your file. It's not critical in most cases, but it's a good idea nevertheless to follow the 8.3 naming convention. You should also somehow incorporate the version number in your file name. Once you name your file, find a suitable place to store it on your hard drive, and click **OK**. Now you will see the Add Files dialog box.



Browse to the root folder of your scenery. In the Folders box, make sure Add subfolders is checked. Click the **Add with Wildcards** button. Your whole scenery folder will now be zipped up, including your scenery and texture subfolders. You won't see them in the archive, but the folder structure will be retained. Note: If your final archive is several MB in size, you may want to consider splitting it into several smaller files and offering this several file option for ease of downloading. Several utilities are available that will split a large archive file into several smaller ones.

Now gather all your seed texture files and/or any textures required by your dynamic scenery. In other words, gather all the textures that must be installed to the main FS texture folder into a separate .zip file. Give it a logical name, such as MAINTEXT.ZIP or something similar. Now add this zip file to your main archive.

Write a small plain text file called README.TXT that will be the first document your end-user will read upon opening the archive. This should give the initial instructions pointing to your main documentation file. Add this file to your archive.

At this point, it is simply a matter of instructing your end-user to open the downloaded archive, click the **Extract** button, create a root folder on their hard drive and extract the archive to this root folder, making sure that All Files and Use folder names are checked in the Extract Dialog box. Once the archive is extracted with Use folder names checked, WinZip creates the scenery and texture folders and the proper files are already in their proper folders. As well, all your documentation is in your scenery's root folder for future reference.

After this, it's simply a matter of extracting the MAINTEXT.ZIP file to the main FS texture directory and file installation is complete. All that remains of the installation is to follow your well-written documentation to register the scenery location in the Scenery Library. After download time, your end-user should have spent less than five minutes installing your scenery.

Optional Installation methods

WinZip 7.0 comes with its own utility called the WinZip Self-Extractor for creating self-extracting archives. This eliminates the need for your end-user to have WinZip 7.0 and considerably streamlines the installation process. Once downloaded, the self-extracting archive only needs to be double-clicked. Your end-user can then follow easy instruction prompts to install your scenery. The only downside of this method is that some Internet sites are leery of making .EXE files available for download. Some absolutely prohibit the practice. You can work around this by simply adding your self-extracting archive to a regular zip file.

For a more professional installation, you can also use InstallShield Express. This further automates the installation into an essentially hands-off process, depending on the complexity of the installation routine. Be aware, though, that using InstallShield may significantly increase the file size. Also the cost of the program itself may be prohibitive for most freeware designers.

Scenery Design Corner

Where to upload?

Probably the most central archive for Flight Simulator files is IUP's world-famous flight-sim uploads, located at <ftp://ftp.iup.edu/flight-sim/uploads>. By uploading your file here you are ensuring that it will be propagated throughout the Internet on all the various IUP mirrors. Other sites include <http://www.flightsim.com> and <http://www.avsim.com>. Also, if you have a Web site you can make it available there. Be careful of bandwidth considerations, though, if any, at your personal Web site. Many Internet providers will provide a few megabytes of space on their servers to create a personal Web site. The fine print usually says that they offer a ridiculously miniscule bandwidth quota before

changing extra. Make sure to read this fine print in your service agreement before placing the files on your personal Web site. If you have a popular file, you can quickly eat up your monthly bandwidth quota and be liable for significant extra charges. (I learned this from hard experience on my first Web site!)

Make sure to upload a small plain text file identically named with your archive. This should only be a brief description of the archive file so end users will know what they are downloading.

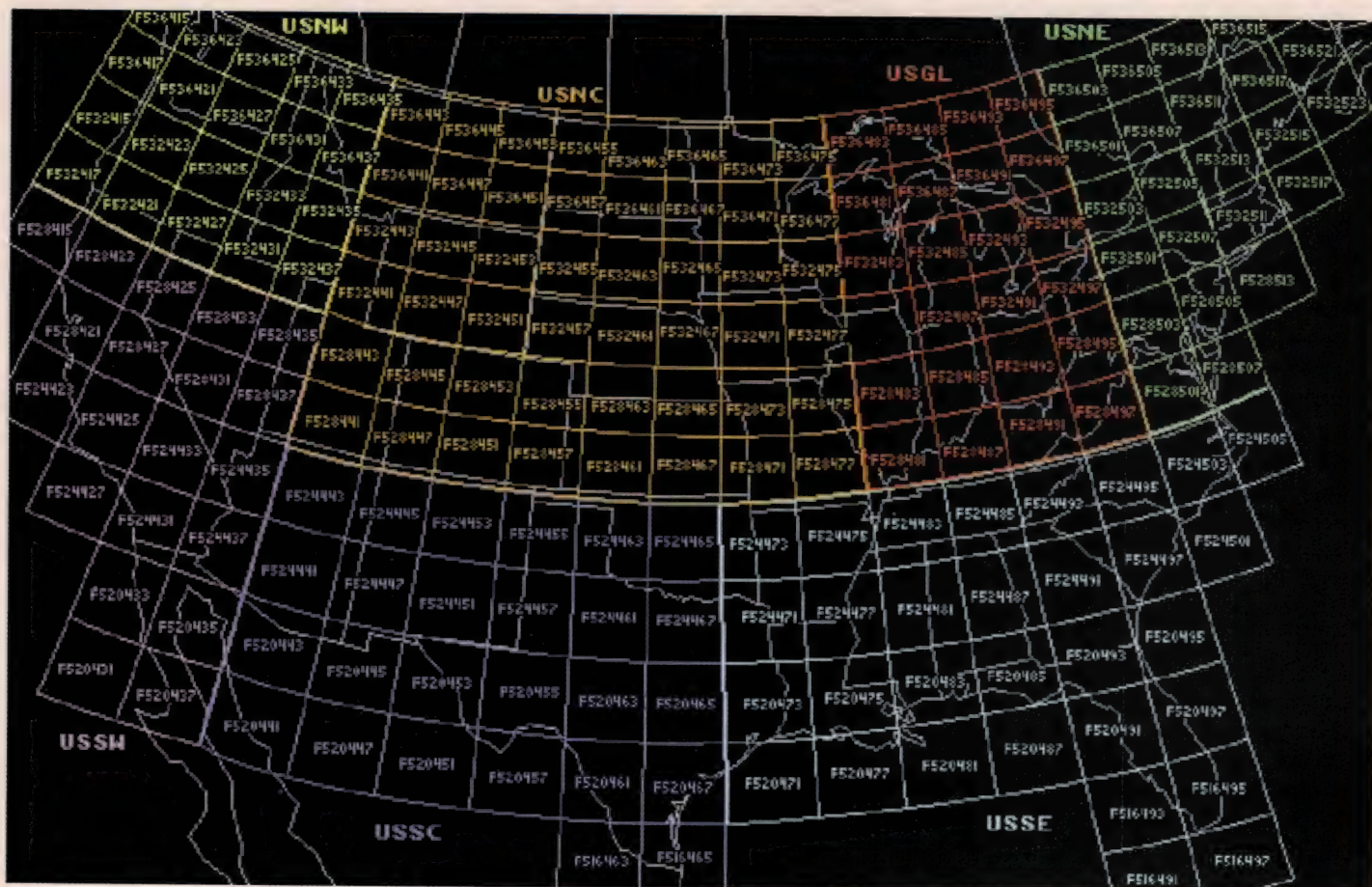
Well, there you have it. Designing a major scenery project from planning to distribution. Now, get to work making that next great scenery package!

Stay tuned for the next issue, when we will be discussing the new elevated-mesh terrain capabilities of ASD 2.0, coming in May.

See ya next time, and happy building!

Help For Scenery Designers

This map, created by Dan Geis, is a graphic layout of the USA scenery areas and the associated BGLs that are in them. This could prove very handy for scenery designers and for people who just want to know where the BGLs are located that they may be looking for or to disable.



Round Robin Adventure #6

By Al Pelletier

Welcome to the sixth Round Robin (RR) written for *Full Throttle* magazine. This one is *Back to the flight-sim roots* and takes place in the Chicago area. It's written as a pilot trainer for a mid-size to heavy plane and was flown with a Boeing 757 in UPS livery, (from *The Next Generation* by AETI/Up Front Simulations) in Microsoft FS98.

This Round Robin was flown with Microsoft FS 98. However, it can be flown with any flight simulator that has the required airports and nav aids.

We will begin at General Mitchell Intl. Airport in Milwaukee and do a quick ILS approach into Chicago, O'Hare. Then we will transit to Indianapolis, move on to Grand Rapids and finally return to General Mitchell. The highlight is an NDB approach at Gen. Mitchell with low clouds and visibility. As for the geography, we will fly over four states: Wisconsin, Illinois, Indiana and Michigan.

The Round Robins use real-world navigation

This RR was flown using Microsoft's default FS98 scenery, along with Senior Editor Jim Rhoads' Indiana V. 2.0 scenery for the state of Indiana, Chris Gilbert's scenery for Chicago O'Hare International v. 1.0, and Michael Wood's Milwaukee 98. All of the custom scenery is freeware that may be downloaded with the information at the end of this feature. It can also be flown in any simulators that have the

required nav aids and airports. If you followed previous RRs, skip the next paragraph, jump right in, and have fun.

For those who are new to this, Round Robins are published so flight simmers can fly, look at the scenery, refresh geographical knowledge, practice cross-country navigation, fly approaches at different airports all over the world, and have fun.

You will be given information like: airport departure and runway number, VORs and ADFs enroute, two or three middle airport destinations for VFR or INST approach, and return to your point of departure (hence the name, Round Robin).

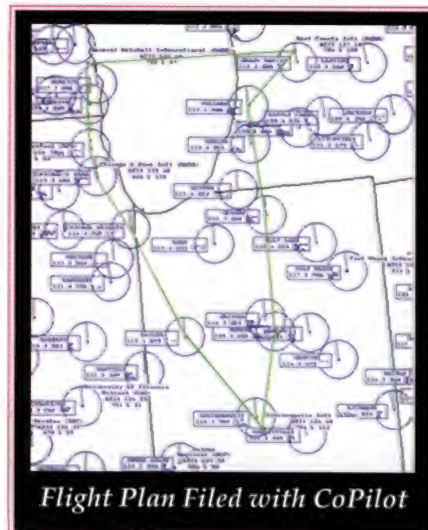
You will also be given ILS and LOM frequencies, minimums, procedures, etc. You will get information on the scenery needed to complete the flight and where to get it, as well as who created the scenery (for noncommercial) and a little background on the geography of the area.

After you do a few of these, you will have a much better command and understanding of the different types of published procedures. You will learn to

Route

Milwaukee/General Mitchell Int'l (KMKE) to Chicago-O'Hare Int'l (KORD) to Indianapolis Int'l (KIND) to Grand Rapids/Kent County Int'l (KGRR) to General Mitchell (KMKE)

(approximate distance: 520nm)



A Lake Michigan Area Round Robin Adventure



Sectional Chart for the flight

handle a lot of information in a very short time, while still maintaining control of your aircraft.

I also suggest that you read the entire route a couple times before starting out, so that you'll have the flight plan fairly clear in your mind.

First Leg

From: General Mitchell (KMKE)

To: Chicago-O'Hare (KORD)

Distance: 58nm

- ✈ Set the FS clock to 07:00, weather: CAVU (Ceiling and Visibility Unlimited).
- ✈ In the Go To Airport dialog box, select Milwaukee's General Mitchell Intl (MKE) airport, RWY 19R.
- ✈ Dial in the Northbrook (OBK) VOR 113.0 on Nav 2 and O'Hare ILS 109.75 (I-ORD) on NAV 2, along with the LOM Roamy (OR) frequency 394.
- ✈ Set course 142 on your Nav 1 OBI.
- ✈ Take off with a left climbing turn to 5,000ft, HDG 180°. Track the OBK VOR to on top.

For the experienced flyers, please be patient through all the explanations, directions and extras. I direct this at newcomers to the flying world. I must stick to plain language.



On the Ramp at Milwaukee's General Mitchell Intl



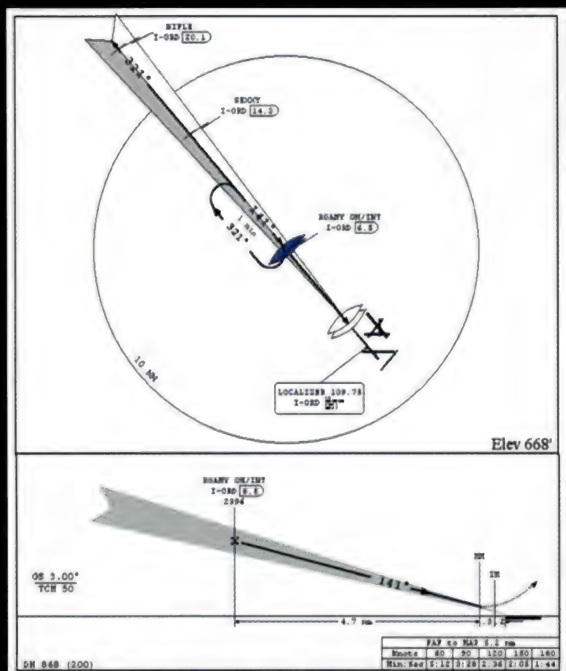
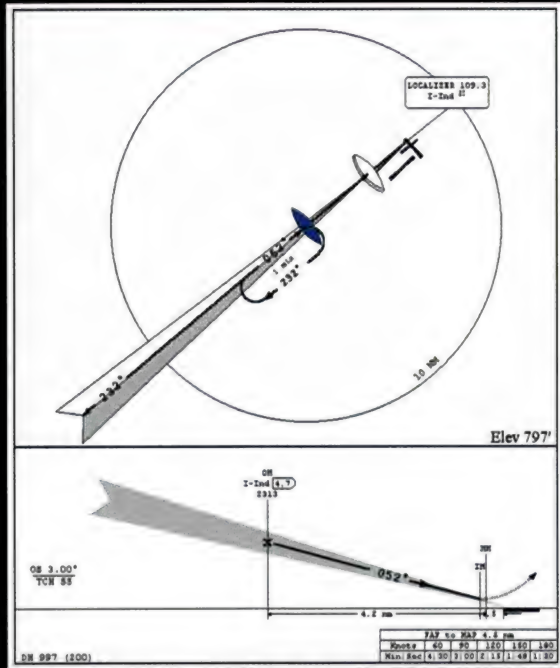
Breaking out over Milwaukee



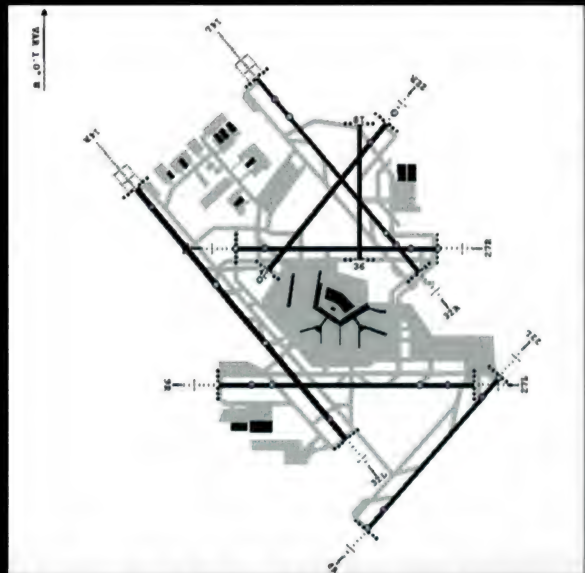
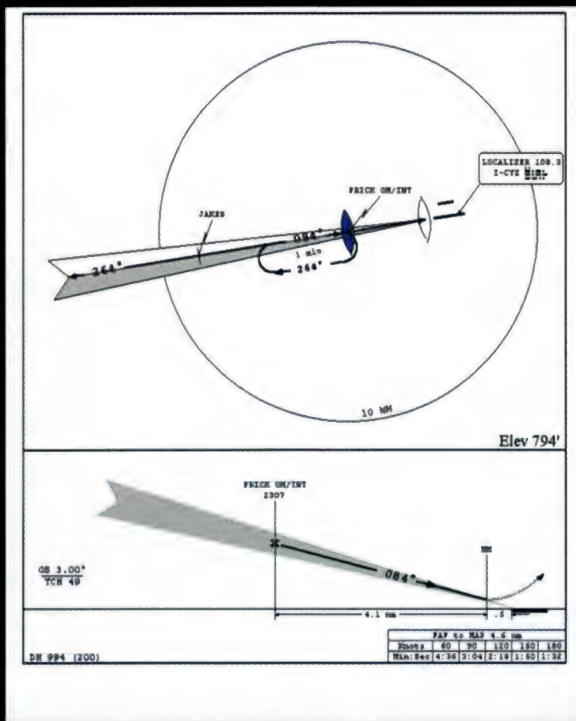
Landing, Chicago O'Hare Intl. Rwy. 14R



A Lake Michigan Area Round Robin Adventure



Airport charts that you'll need in this RR adventure



A Lake Michigan Area Round Robin Adventure

- ✈ On top OBK, turn right to HDG 270° to intercept the Bifle intersection, in preparation for an ILS to RWY 14R (Actual course 142°, elevation 668ft, RWY length 13,000ft).

NOTE: You will be at the Bifle intersection when you are 10.7 NM out of the OBK VOR.

- ✈ After the Bifle intercept, maintain HDG for one minute and begin a descent to 2,400ft. After one minute, turn right HDG 100° to intercept the LOC, and carry out the approach.
- ✈ Five nautical miles back, you are cleared for landing at O'Hare RWY 14R. Be sure your gear is down.

LAND O'Hare

Second Leg

From: Chicago-O'Hare (KORD)

To: Indianapolis (IND)

Distance: 150nm

- ✈ Set FS's clock to 08:30.
- ✈ Taxi to RWY 14L. Dial in the Chicago Heights (CGT) VOR 114.20.
- ✈ Takeoff with a right climbing turn to 13,000ft, HDG 145°, and track the CGT VOR to on top.
- ✈ On top of CGT, dial in and track the Boiler (BVT) VOR 115.10 to on top.



On the ramp at Chicago O'Hare Intl.



Landing Indianapolis Intl. Rwy. 5L!

- ✈ Enroute to Boiler, dial in the ILS/LOC (I-IND) 109.3 on NAV 1 and the LOM PULLY (IN) 266 in preparation for an ILS to RWY 5L. (Actual course: 047°, elevation 797ft, RWY length 11,200ft).
- ✈ On top of Boiler VOR, dial in and track the Indianapolis (VHP) 116.30 to on top, and begin descending to 7,000ft.
- ✈ On top of VHP, turn right to HDG 191°, home the LOM Pully, and continue descending to 3,000ft.
- ✈ Over Pully, maintain HDG 190° for 1.5 minutes, then turn right to HDG 010° to intercept the LOC.
- ✈ Continue with the approach.
- ✈ 5nm back, you are cleared for landing RWY 5L at Indianapolis Intl. Check to be sure your gear is down.

Internet links for the scenery used in this Round Robin

Jim Rhoads' Indiana scenery:

<ftp://ftp.abacuspublisher.com/pub/IndianaV2.zip>

Chris Gilbert's Chicago O'Hare scenery:

<ftp://wings.ark.com/pub/iup-mirror/uploads/ordohare.zip>

Michael Wood's Milwaukee 98:

<http://www.flightsim.com> Search for the file mke_98.zip

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<http://www.simpilot.com>



A Lake Michigan Area Round Robin Adventure



Landing, Kent County Intl. Rwy 8R

LAND Indianapolis

Third Leg

From: Indianapolis (IND)

To: Grand Rapids/Kent County

Distance: 200nm

- ✈ Set FS's clock to 13:00.
- ✈ Dial in the Kokomo (OKK) VOR 109.80.
- ✈ Taxi to RWY 05R, and take off with a left climbing turn to 19,000ft, HDG 008°. Track the OKK VOR. On top of OKK, dial in and track the Goshen (GSH) VOR 113.7. On top of GSH, dial in and track the Pullman (PMM) VOR 112.1.
- ✈ 40nm out of PMM, begin descending to 6,500ft. On top of PMM, turn right HDG 029°, maintain this HDG to intercept the LOC (about a 30nm run), and continue your descent to 2,400ft.
- ✈ Dial in the LOC (CYZ) 108.3 and set course 085 on your OBI, in preparation for an ILS to RWY 8R at Kent County Intl. (actual course: 085°, elevation 794ft, RWY length 10,000ft).
- ✈ Intercept the LOC and continue with the approach.
- ✈ 5nm back, you are cleared for landing RWY 8R. Check that your gear is down.

LAND Grand Rapids

Fourth Leg

From: Grand Rapids/Kent County

To: Milwaukee General Mitchell (KMKE)

Distance: 22nm

- ✈ Set the FS clock to 15:15 (winter).
- ✈ Set weather: 2,300ft overcast, visibility five miles, wind 360/18.
- ✈ Dial in the Badger (BAE) VOR 116.4 on NAV 2 with the LOM/NDB Cappy (MK) frequency 410 on your ADF.
- ✈ Taxi to RWY 26L, and take off with a right climbing turn to 21,000', HDG 275°. Track the BAE VOR on reception.
- ✈ 50nm out of the BAE VOR, begin your descent to 5,000ft, and prepare for an NDB approach to RWY 1L at MKE. (Actual RWY HDG 009°, elevation 723ft, RWY length 9,690ft).
- ✈ 25nm out of the BAE VOR, turn left and home the CAPPY NDB/LOM to on top and continue descending to 2,800ft.
- ✈ Over the NDB outbound, continue for one minute, then turn left HDG 144° for one minute, then right turn to HDG 324°. Home back the NDB as soon as the needle is pointing to 009°.
- ✈ Overfly the NDB inbound on a HDG of 009° and continue the approach as per published plate. (You should be at 2,600ft altitude when over flying the NDB inbound.)
- ✈ You are cleared to land RWY 1L.

LAND Milwaukee

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(remember: 24 hours from bottle to throttle)*

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apeltier@mars.ark.com

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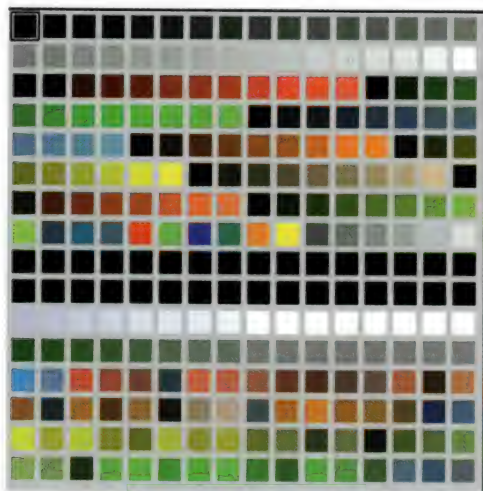
By David Lewis

This issue: Airborne at last

If you have been following this column, we have been building a Tiger Moth aircraft for Flight Simulator, from the wheels up. This issue deals with the flight dynamics of the Tiger Moth. If you've been following this series, you should by now have built and painted your own beautiful biplane, ready to fly.

But before we start on the flight dynamics, here are a couple things that I've discovered since these articles started. Firstly, a new set of tools is available for building components. Created by Kirby Kern, the package is called "AF5tools," which is available to download for free from the usual Internet sites. The best of the bunch is a tool that lets you build the front and rear bulkheads, and it lays a skin between them as a component. I can't tell you how much time this would have saved me on projects like this one. Great job, Kirby!

Following last issue's attempt to describe the colors available for hex-editing color changes, I realized that a picture paints a thousand words, so here's the complete palette for you to pick from:



The complete FS palette

Preparation

To set the flight dynamics, you will need suitable software, a source of information on the aircraft's handling, and a system. You have a number of software options. A good starting point is to use FS5, and then Flight Shop's integrated Flight Dynamics Editor (FDE). Simply load your plane into FS5, and select **Options... | Design**. The great thing about this is that you can adjust parameters literally "in flight" and see what the effect is. The drawbacks are that you can't choose to equip your plane with some of the newer options (such as autothrottle), and worst of all, when you've got your plane just right in FDE and use the free Microsoft converter to transfer it to FS98, the handling is often totally different. Even so, this is usually where I start.

The next option is to use Aircraft Dynamics Editor (ADE), which is available free over the Internet and included with some CD-ROM packages. This allows more options to be edited, but it doesn't ripple through the changes. For example, if you reduce the stalling speed in FDE, the lift factor of the wing is increased, to keep the plane just about airborne at that speed. Change the stall speed in ADE and it only affects how soon the stall warning horn sounds. Your plane may have fallen from the sky long before slowing to stall speed.

ADE's other drawback is that it isn't complete. Many parameters describe an aircraft's handling, and not all are understood. ADE only allows you change the ones that are known and can be described. If you want to go for the full monty, AirEd is the latest offering, and is another free download from the Internet. AirEd shows you everything, including parameters whose only description is "record 1101, offset 000C." You can spend hours or even days investigating the effect of changes to some of these parameters. Like ADE, AirEd changes just what you specify, with no correlation to other values.



Aircraft type		DH82A Tiger Moth		Date this version	19/12/1998
Configuration		Aerodynamics			
Main wing span	29' 4" (352")	Max. Mach	0.25 (roughly)		
Aspect ratio	3.6	Zero flap stall	30 kts		
Distance from CoG		Full flap stall	25 kts		
Dihedral	3.63 (average)	Zero-lift drag			
Winglets	N	Induced drag			
Canard	N	Flap drag	0		
Hstab distance		Spoiler drag	.01 (to start)		
Hstab area	24 sq. ft	Gear drag	0 (fixed gear)		
Hstab span	10'2 (122")	Flap moment	0		
Tail distance		Gear moment	0 (fixed gear)		
Tail area	27 sq. ft	Dihedral scalar			
Landing gear type	Fixed	Elevator scalar			
Weight & Balance		Aileron scalar			
Empty weight	1580 lbs	Rudder scalar			
Main fuel	24 US gal (142 lb)	Pitch stability			
Aux. fuel	0	Roll stability			
Pitch moment		Yaw stability			
Roll moment		Gear & scrape	(lat/vert/ion)		
Yaw moment		Right main gear			
Engines		Centre gear			
Engine type	reciprocating	Nose scrape			
How many?	1	Tail scrape			
Max. power	130 hp	Rt wing scrape			
Fuel consum.					
Prop type	fixed	Misc.			
Prop high RPM	2400	Length	23' 11" (287")		
Prop diameter	72"	Height	8' 9.5" (105.5")		
Turbine temp.		Max. level speed	92 kts at sea level		
Oil temp		Cruise speed	70-75 kts		
Oil pressure		Range	210 nm		
EGT		Ceiling	13,600'		
Engine 1 pos.		Vne	156 kts		
Engine 2 pos.		Endurance	2.5 hrs @ 70 kts		
Engine 3 pos.		Rate of climb	700-800 fpm		
Engine 4 pos.					



My preferred route is to start with the FDE in FS5 (because I've still got my old copy of FS5.1), but not to flight test in FS5. So I set up the plane, and straight away convert it to FS98 and test it there. If there are obvious problems with the handling, I change my numbers and go around the loop again. Once the basics seem right, I use ADE or AirEd to fine-tune the parameters that aren't accessible in FDE.

Start with the basics

I always start with the basic facts that can be gathered from reference books like *Jane's All the World's Aircraft*. A simple form helps to gather the right information in a useful sequence. Here's one I prepared for the Tiger Moth:

Unknown factors can be left to default from the Aircraft Factory template until you've done some testing.

Aspect ratio must often be calculated from wingspan and area. The formula is span / mean chord, or span squared / area. For biplanes it's best to use the span squared formula, and make some other adjustments later.

I've taken some liberties with the treatment of flaps. Although these were not fitted to the Tiger Moth, automatic leading edge slats were fitted to the upper wings, which "pop out" as the speed drops below about 45 kts. These slats can be locked shut (e.g., for aerobatic maneuvers), and so I plan to use the "flaps" control to reflect slats being locked/unlocked. Clearly they should not carry much drag, unlike regular flaps. Also, to minimize their effect, there should not be much change in stall speed.

Without a doubt the most important piece of information, and the hardest to find is the position of the center of gravity. From your drawings you can figure out the distances fore & aft of all the parts, if only you knew where the center should be. A good rule of thumb is:

Take a point on the wing leading edge, halfway from the root to the wingtip. Find a point a quarter of the distance from there to the trailing edge of the wing (call this the "wing quarter-chord point"). Repeat this process to find the horizontal stabilizer's quarter-chord point. Divide the area of the wings by the area of the horizontal stabilizers (call this the "surface area ratio"). Position the center of gravity between the two quarter-chord points in

Problem planes No. 6: Is it supposed to do that?

Most of the information in this article has been the simple numerical stuff that can be found in reference books. The harder part of producing flight dynamics is recreating the "feel" of the aircraft.

I know it can be frustrating sometimes just to build a plane that flies in a safe and stable fashion, and comes somewhere near the published performance. I've had planes that would uncontrollably wag their tails from side to side at high speed, and then crack up, for example, and fixing that seemed a major achievement. But that's just a case of fighting the system, and it's not about the handling characteristics that separate a Tiger Moth from a Stearman, for example.

How tightly can your chosen aircraft turn? How many degrees per second should it roll? How far can it be banked without losing height? These are the kind of questions that aren't answered in the usual reference books. So where do you go to find out?

One good source is real aviation magazines. They often run flight tests and reports on new aircraft, and even classic aircraft. In the UK, *Pilot* magazine runs three flight reports most months,

and covers all kinds of aircraft from the Tiger Moth, through touring machines and warbirds to airliners. So check the shelves at your nearest newsagent.

Another place to look is in the aircraft's operating handbook (if you can get hold of a copy). This covers valuable data like the allowable positioning of the center of gravity (in case the pilot overloads the aircraft and makes it unstable) and correct RPM settings to cruise at different speeds and altitudes. When your model matches those accurately, you know you're really getting close to reality.

However, the best source of information I've found is an actual pilot who has flown the machine in question. In my experience, there is little they enjoy more than discussing the relative merits and shortcomings of aircraft and reminiscing in minute detail about obscure starting procedures, and other quirky behaviour. This is just what you want, of course! Best of all, many willing pilots can be found on the Internet through message boards (like the one at <http://www.flightsim.com>) and through their homepages, complete with photographs of them at the controls of the machine they love best. Remember that a pilot on the Net already has a computer, and probably a simulator program, and so can thoroughly test your work for you. Good hunting!

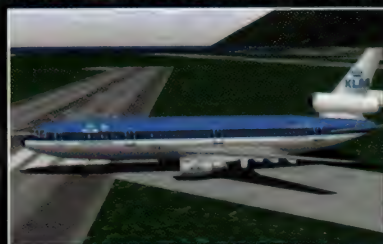


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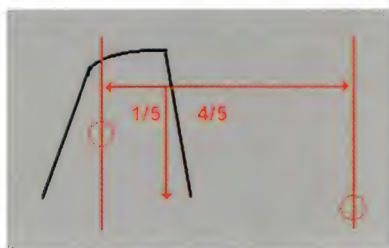
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proportion to the surface area ratio. For example, if the wing area is four times the area of the stabilizers, then assume that the center of gravity is positioned 1/5 of the separation behind the wing (a 4:1 ratio).



Center of Gravity

Structured flight testing

Once the facts and measurements are sorted out, it's time to work on the intangibles, like stability. Everyone has their own system when it comes to the intangibles. My approach is to run a series of tests, each designed to establish one or two parameters.

The first test is a run up the runway. Find out how long a runway this aircraft should need, and choose an airport with just that length. Also, see if you can find the lift-off speed. Airliners have several speeds, including V_r (when the nose lifts off and the aircraft rotates) and V_2 (the speed at which it is safe to take off). If you don't know, you can always guess at about 25% above stall speed.

Start the engine, give it full throttle, and charge down the runway, accelerating toward take-off. Check that the aircraft gets up to take-off speed before running out of road, but not too soon. Adjust the zero-lift drag to get the right balance. Check that the plane takes off when the speed is high enough. If not, reduce the stall speed. If it lifts too soon, increase the stall speed.

Once airborne, climb out straight forward at the official climb speed (if known), and see how high it is possible to climb. Fly a regular circuit, and form an opinion of the handling.

Following the circuit, I usually indulge in some aerobatics, starting with a slow aileron roll, then a Cuban 8 and a stall turn. How well you expect these to go depends very much on the aircraft under development—I'd be very worried if my 747 could withstand a stall turn! However, these maneuvers should give useful pointers for changes to stability factors that will make the aircraft handle typical speeds and maneuvers well.

Finally, I run a series of timed cruise sections at different heights and power settings to check the fuel consumption. Economy cruise speeds and altitudes are often available, and this is an easy set-up to recreate. This whole subject was detailed extremely well in a series in this magazine recently. In principle, you just want to figure out your endurance under cruise conditions (total fuel divided by fuel burned in one hour equals hours aloft). Then you can multiply endurance by cruise speed to get the economical range of the aircraft. This should be close to published figures, and maybe somewhat higher, since the published range may allow for some fuel to be held in reserve.

Have fun getting into the air. Next time I'll talk about the changes I made to my Tiger Moth and look at the finishing touches.

Virtual Flight Training: Flight Planning

By David Lewis

You'll be flying a jet for this flight; you can choose your favorite. Most importantly, choose an instrument panel that lets you watch both NAV displays at once. For this exercise, I have chosen the FS98 default Learjet 45, with a custom panel made for the CoPilot GPS navigation program.

There are a lot of procedures to follow in this environment, and at high speed it will all happen in a hurry, so prepare well before you start.

Start the simulator, and go to San Francisco International Airport. If possible, set yourself up parked at the terminal, with the engines off. You can choose any weather conditions you like, depending on how much of a challenge you want. Winds should be fairly light, since either take-off or landing will be downwind. That's not as unusual as you might think—many airports even have a preferred runway direction. At London's Heathrow, for example, runways 27L/R are used in preference to 09L/R with a tailwind up to five knots. However, for this issue it's just a shortcut, and we'll look more closely at the proper approach procedure next time.



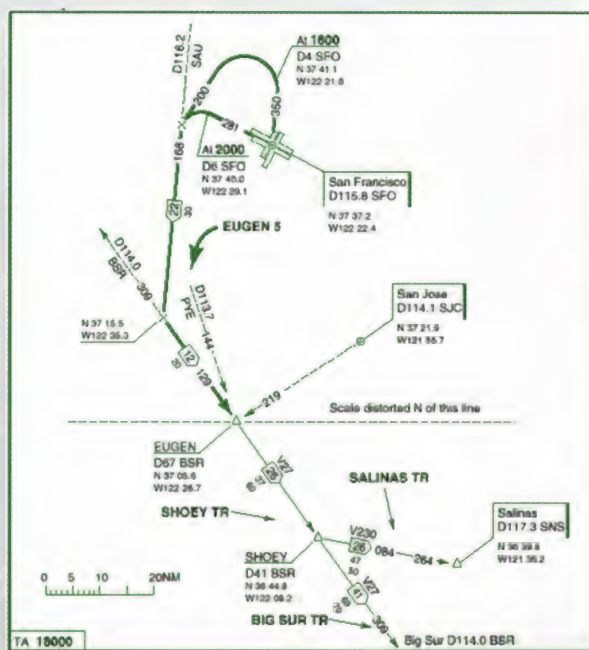
Parked by the terminal at San Francisco Intl.

Flight No. 8:

San Francisco International to
San Diego Lindbergh Field

During the past year, this column has looked at the development of navigation and flight planning, from the earliest days of biplanes with road maps in the cockpit to the latest jet airways. By now you can use all the navigation aids in the cockpit, and it's time to put it all together and fly with the big boys.

If you have access to the Internet, one site you might like to check out is Steve's Flight School (<http://super.zippo.com/~flight>). Contrary to the name, last time I checked this site there was no tutorial material but there was a series of exams to check your proficiency. You can submit your answers, and in return be awarded your virtual wings.



Standard Instrument Departure for San Francisco

Virtual Flight Training: Flight Planning

The diagram shows a Standard Instrument Departure (SID) for San Francisco. This one is EUGEN 5 SID, so called because it passes through EUGEN Intersection, and it's the fifth SID to pass through that intersection. Beyond EUGEN, the SID takes you onto an airway, which can happen at any of three places—the *transitions*. The three transitions are SHOEY, Salinas VOR and Big Sur VOR. You'll be flying the Big Sur transition, so your flight plan starts "EUGEN - SHOEY - BSR."

The SID shows that, after take-off from runway 28, you fly straight ahead on 281 degrees magnetic, and climb to 2000' by the time you reach six miles from SFO on the DME. Then turn left onto a heading of 168 degrees, just in time to join the 168 radial from Sausalito VOR. Then continue along the radial for 22 miles to the next waypoint.

Before take-off, tune in San Francisco VOR on NAV2. The frequency is 115.80, and you'll only be using the DME. Also tune in Sausalito VOR on NAV1, frequency 116.2, and set the OBI to 168 degrees.

So, you tune in clearance delivery, call in your flight plan, and get handed off to ground movement control. Call them, get clearance for engine start and push back, and taxi to runway 28L. Wait, hand off to the tower, and get clearance to depart. Pull out onto the runway, take off, and you are soon handed off to departure control. By the time you've retracted the flaps, you've changed frequency at least four times—see what I meant about being busy? This is where you wish you had a co-pilot to help out.



Ready for takeoff-runway 28L

Once you're established on the Salinas 168 radial, retune NAV2 to Big Sur VOR on 114.00 and set the OBI to 129. Continue climbing toward your enroute altitude. As the needle starts to move, turn left onto a heading of 129, and line up on the radial. The turn should come at 69 DME from Big Sur. It's also probably about 35 DME from Sausalito, but that's not an official way of marking the fix.

Charts

The entire route planning for this journey was done with charts. Where do you get them? Well, in the US you're lucky, because NOAA enroute charts like the ones I use are available for as little as \$6 each. Check your local pilot supplies shop (or search the Internet) for them. In fact, I've seen NOAA terminal procedures (SIDs, STARs and instrument approach plates) for only \$4 a volume, and the whole US is only 20 volumes.

For the UK I bought a complete Aerad flight manual (without revisions) for 50 pounds two years ago. Aerad is a division of British Airways. That gives me terminal procedures and low-level enroute charts. I've also bought a Jeppesen low-level enroute chart for Europe at a reasonable price.

But the best things in life are free, and you'll be delighted to hear that pilots are required to throw their charts away on a regular basis. For example, most of my charts have a life of two months printed on them. So hang around your local airport and ask around, and you may get what you want for nothing!

Also check out the SAS FSS Web site at <http://www.dalnet.se/sasfss> for many terminal procedures around the world, or <http://www.mhv.net/~christie/EWRafd.html> for the Northeast US, and there are other sites like that.

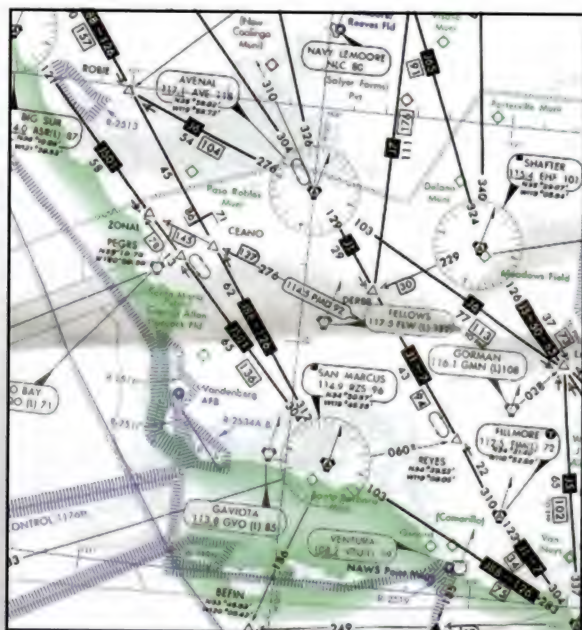


Established on 168 radial to Salinas

Virtual Flight Training: Flight Planning

Twelve miles along the radial into Big Sur (i.e., BSR 67 DME), you cross EUGEN intersection. You should have reached at least 6,000' by this point, and you are now flying in airway V27. The other way to check your position at EUGEN is by retuning NAV1 to San Jose on 114.1 and setting the OBI to 219 degrees. The needle centers just as you cross EUGEN. Between EUGEN and Big Sur you will be handed off to Oakland Center on 127.45—another voice on the radio.

Plan to reach Big Sur at a cruising altitude of exactly 17,000'. The transition altitude on this departure is 18,000', so remember to adjust your altimeter to 1013.2 mb or 29.91 inches as you pass 18,000', and talk about flight levels from here on.



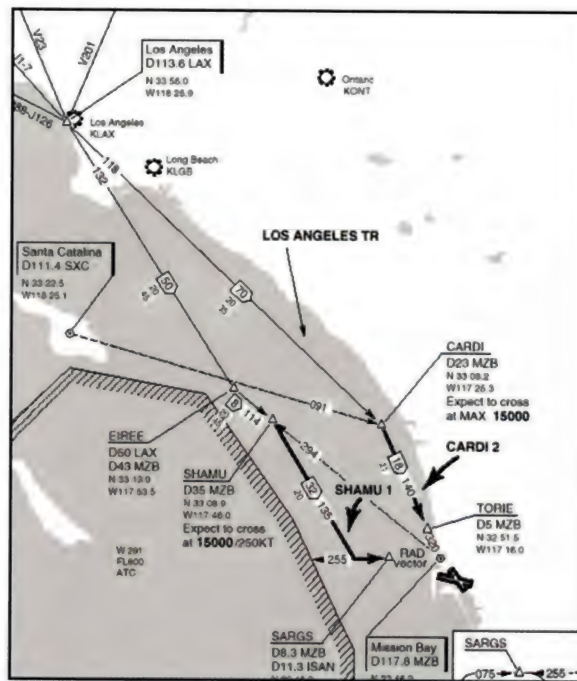
Enroute sectional

The next chart shows the enroute section. From Big Sur you can fly straight to San Marcus VOR on J501, and from there to LAX on J88. The point of getting so much altitude is two-fold. Aside from the improved efficiency of jet engines at altitude, it also lets you fly straight over the Hunter Low MOA (military operating area), instead of going around it. The jet airways start at 18,000', so you'll need to climb smartly to FL190. If you want to keep going, you can cruise at FL210, 230, 250, 270, and 290, or even 330. (The spacing gets wider above FL290.)

As you pass Big Sur, you need to turn slightly onto a heading of 121 degrees. Remember to adjust the OBI on NAV2 at the same time. Keep an accurate heading, and especially avoid drifting to the left, so as not to enter restricted area R-2513 on the Hunter Liggett military reservation. I wouldn't like you to get in trouble with the military.

Along this stretch retune NAV1 to San Marcus VOR on 114.9 with an OBI of 124. At 58 DME from Big Sur (78 from San Marcus), you pass ZONAL intersection, and change ATCCs. Retune your COM to call Los Angeles center. You can now fly direct to San Marcus, straight down the radial.

At San Marcus, turn onto 103 degrees (remember to change the OBI), and tune NAV2 to LAX on 113.6. Fly direct to LAX, just 75 miles. As you reach LAX you will transition into your arrival procedure for San Diego.



Standard Terminal Arrival for San Diego

The diagram shows a Standard Terminal Arrival (STAR) for San Diego. You'll fly the LAX-CARDI transition of CARDI 2 STAR.

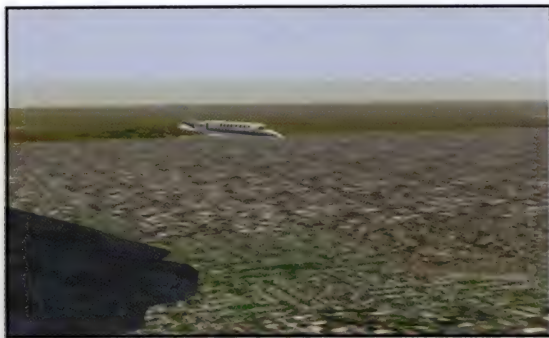
Out of Los Angeles fly a heading of 118. Tune NAV1 to Mission Bay VOR on 117.8, and set the OBS to 140, to fix your position at CARDI. When the needle centers (at 70 DME from LAX), you're at CARDI. The chances are that by that distance you may have lost reception on LAX VOR, so the other aid you can use to fix your position at CARDI is on the 091 radial from Santa Catalina VOR (111.40).

The instructions tell you to expect to cross CARDI at a maximum 15,000'. Since you're so close to the destination, a better altitude would be 11,000' or even 9,000', but you may have to be higher if you are likely to get held in the stack at TORIE. Standard descent planning says three miles per 1,000', so you will have to start down soon after passing LAX. You'll also be handed off to San Diego Approach control on 124.35 (yet another voice).



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11,000 ft. over LAX

At CARDI turn onto 140 degrees for 18 miles, to TORIE, and from there expect radar vectors to final. Alternatively, you may be asked to hold at TORIE. In the absence of real radar controllers, I'll vector you on a heading of 140 degrees direct to Mission Bay VOR. From there we can look at the approach chart for that runway, but that can wait until next time.

Who was Merrill C. Meigs?

Did you know that Meigs Field in Chicago was renamed in 1949 to honor Merrill C. Meigs, a Chicago pioneer pilot and former Chairman of the Chicago Aero Commission. Meigs was a newspaper executive for Hearst publications and proposed developing the area called the Northerly Island into an airport to serve the downtown Chicago Loop.

In its busiest year for operations, Meigs Field handled some 91,452 flights in 1968. Passenger volume through Meigs peaked in 1980, when 468,933 passengers came through the airport. Its proximity to downtown Chicago made it a convenient and popular choice with business travelers into the Loop.

Information here is from the Merrill C. Meigs Field home page. Visit their website (<http://www.ci.chi.il.us/WorksMart/Aviation/Meigs/History.html>) for more information.

What's New in 3-D Hardware Acceleration?

By Rod White

Full Throttle continues to follow the latest trends in the fast-developing world of 3-D acceleration technology

3-D-accelerator technology has changed a lot since we last looked at the latest and greatest in 3-D-accelerator boards. So, in this article we'll fill you in on what's hot, cold and even lukewarm in 2-D/3-D solutions and dedicated 3-D-accelerator card technology that can help you get the most out of your flight simulation/combat simulation stick time.

Terminology

First, I'll differentiate between a 2-D/3-D solution and a dedicated 3-D-accelerator board. A 2-D/3-D solution is a video card made for an Accelerated Graphics Port (AGP) or Peripheral Component Inter-connect (PCI) slot on your computer's motherboard. The AGP port is designed to give your computer's CPU more direct access to the display, increasing video performance, especially for 3-D intensive applications.

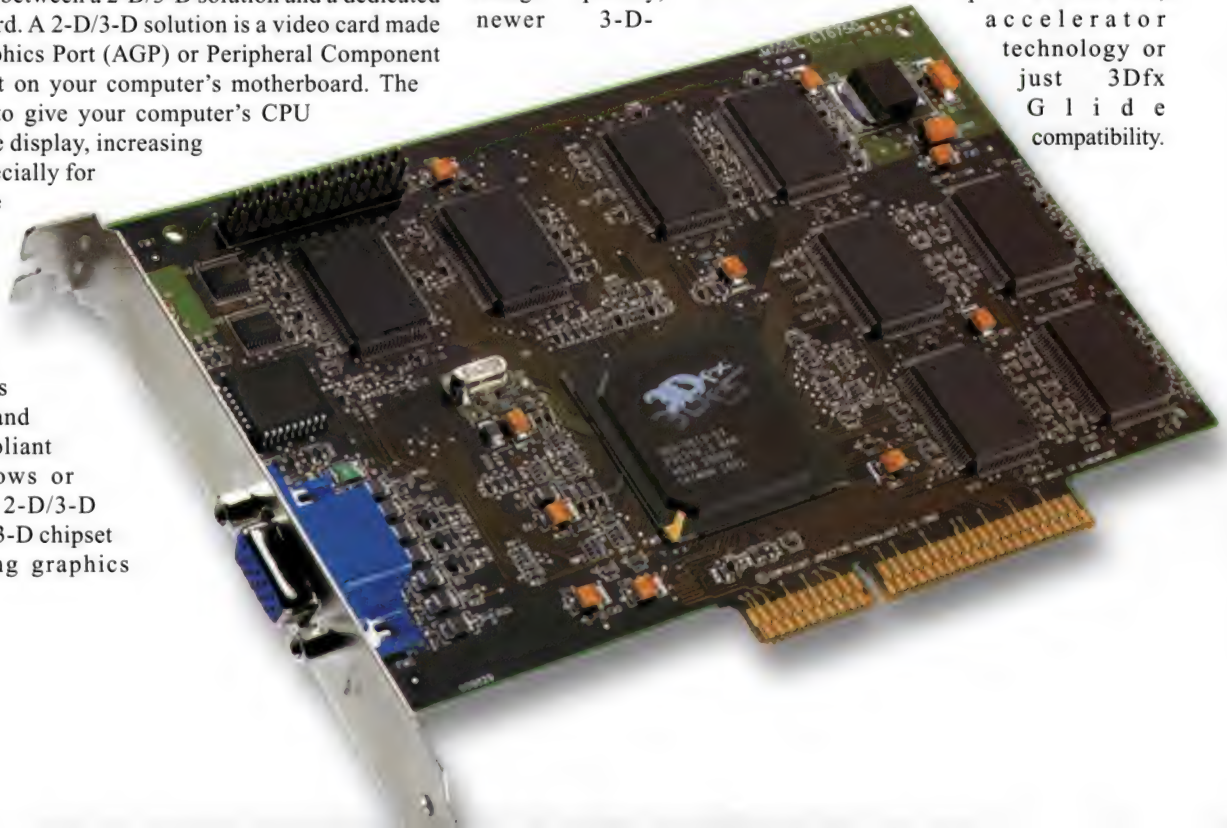
These all-in-one solutions handle the day-to-day 2-D tasks of your desktop applications, such as productivity software and any Direct Draw compliant application in Windows or DOS. Additionally, a 2-D/3-D solution also features a 3-D chipset to handle accelerating graphics

requirements for Computer Assisted Drawing (CAD), as well as Direct 3D, 3Dfx Glide and Open GL games and of course, flight/combat simulators.

While not all 2-D/3-D solutions will support every one of those standards, some do. Essentially, a solid AGP or PCI 2-D/3-D solution is all most simulation enthusiasts need or require.

A dedicated 3-D-accelerator board is based on the 3Dfx Voodoo I and Voodoo II technology. These are the only dedicated 3-D-accelerator video boards available, other than the aging Power VR PCX2-based boards that by today's standards aren't worth looking into (so avoid them like the plague).

A dedicated 3-D accelerator is a nice option for a person who already has an AGP or PCI 2-D or 2-D/3-D solution that handles all of their 2-D tasks just fine, but who is looking for better image quality, faster performance, newer 3-D-accelerator technology or just 3Dfx Glide compatibility.



What's New in 3-D Hardware Acceleration

What do you have now?

You may have a Matrox Millenium II, a first-generation Rendition v1000 board from Creative Labs, or maybe even an S3 Virge-based Stealth 2000 card from Diamond. These are all 2-D/3-D solutions, but none of them cut the mustard when it comes to running newer Direct X6 Direct 3D games. Further, these video cards can't run titles that offer 3Dfx Glide support either. This is where a dedicated 3-D-accelerator solution will benefit you most, because you can run a dedicated 3-D accelerator, like a Voodoo II board, in conjunction with any stand-alone 2-D or 2-D/3-D solution.

Current technology in 2-D/3-D solutions

Currently, the hottest 2-D/3-D solutions are boards based on the nVidia TNT technology. I won't confuse you with a stream of techno-jargon, so I'll keep this simple. The TNT is presently considered the best 2-D/3-D solution by far, because it can render in 32-bit or 16-bit (high) color, and it is a true AGP 2X-part system. This technology is useful for many programs, such as Microsoft Flight Simulator 98, allowing it to run in 3-D mode within a standard Windows 95/98 window. There is no need to operate in "full screen" mode. This can be very useful when running add-on programs that require a new Windows 95/98 window superimposed over the main FS 98 display.

The nVidia TNT chipset will support resolutions as high as 1600x1200, and it is currently one of the fastest and most cost-effective 2-D/3-D solutions on the market. A TNT board will run Direct 3D and Open GL games and simulations, and it has a fast 2-D core, so it handles all of your productivity tasks, Web browsing and even DOS-mode gaming with ease. Some manufacturers like Diamond and STB also offer PCI TNT cards that make one nice option for gaming enthusiasts without an AGP slot. Here's a list of popular TNT boards:

- Diamond Viper 550 16MB (AGP & PCI)
- STB Velocity 4400 16MB (AGP & PCI)
- Canopus Spectra 2500 16MB (AGP)
- Hercules Dynamite TNT 16MB (AGP)
- Creative Labs Blaster TNT 16MB (AGP & PCI)

Any one of these TNT boards is a great option. The only thing that changes between them all is price, because some feature software bundles, TV-out, and other little bells and whistles, but at the core they'll all perform almost identically. A decent TNT board should set you back about \$88-\$120, depending on where you shop.

Boards based on the Matrox G200 technology are another option. The G200 also supports 32-bit rendering, resolutions as high as 1600x1200, and it's a true AGP 2X part, but isn't as fast as a TNT chipset. It only offers support for Direct 3D, and currently is only available for AGP systems. Some have argued the image quality is better than a TNT's, but I feel that the TNT looks slightly better. It's a matter of opinion, I guess, but the G200 image quality really does look fabulous. Below is a rundown of G200-based products:

- Matrox Mystique G200 AGP (8MB upgradable to 16MB)
- Matrox Millenium G200 AGP (8MB upgradable to 16MB)
- Matrox Marvel G200-TV AGP (8MB upgradable to 16MB)

If you shop around, you can find most G200-based boards in the \$89-\$120 price range, depending on where you look. The Mystique G200 also features

TV-out functionality. This looks nice, but it won't replace a nice, big PC monitor. The Marvel G200-TV is a complete video editing solution with a break-out box, giving you video-in, video-out, a TV tuner and the ability to capture still images from a video source. A software

DVD decoder and all the software needed to get the most from this 15-in-1 solution is included in the Marvel G200-TV. The downside is that it does not come cheap. It will set you back about \$250, but it's a fantastic piece of hardware, giving you the means to do more than just play games.

One of the most versatile 2-D/3-D solutions is a board based on the 3Dfx Banshee technology. The limitation is that the Banshee doesn't render in 32-bit, and it's not a true AGP 2X part. However, it supports 3Dfx Glide, Direct 3D and Open GL games and simulations. It's a single-board solution that gives you the means to play most games and simulations 3-D accelerated, although the image quality isn't as good as the TNT and G200. All in all, a 3Dfx Banshee-driven product is a solid performer, with decent image quality that's on par with Voodoo II, and features an affordable price point of around \$99-\$110.

Some manufacturers also offer PCI-based 3Dfx Banshee boards, which makes one a nice option for those still running early PII-class systems without an AGP slot, or even those on Pentium 200-233 MHz-class machines. Here's a rundown of popular 3Dfx Banshee-driven products:



What's New In 3-D Hardware Acceleration



*Aircraft from WW II Fighters
in both 16-bit and 32-bit color*



*WW II Fighters cockpit in both 16-bit
and 32-bit color*



*Cockpit from Microsoft Combat Flight Simulator
in both 16-bit and 32-bit color*

- Diamond Monster Fusion 16MB (AGP & PCI)
- Creative Labs 3D Blaster Banshee 16MB (AGP)
- Quantum 3D Raven 16MB (AGP)

A few other 2-D/3-D options are available at the lower end of the price spectrum. An S3 Savage3D-driven product like the Hercules Beast and Beast Supercharged are true AGP 2X parts. They can render in 32-bit color, featuring support for Direct 3D and Open GL, and are slightly faster than a Matrox G200-driven system. Their image quality is better than Banshee & Voodoo II, but not quite as sharp as the TNT or G200 products. The price point is \$63-\$99 for one, and now that Hercules and S3 have been working hard on updated drivers, the Beast is finally a more solid and inexpensive option for those looking for a 2-D/3-D solution.

At the very bottom of the spectrum are the boards based on the Intel i740 technology. Even by today's standards the image quality rendered is very nice, though it doesn't render in 32-bit, and the performance isn't in the same ballpark as the G200 or Banshee. But most i740 boards perform a little better than a 4MB 3Dfx Voodoo I-driven product.

Also, they are true AGP 2X parts, and you can pick one up for about \$50-\$75, possibly even less. An i740 board is a nice option if you are a casual gaming enthusiast looking for a very inexpensive AGP 2X primary display board with support for Direct 3D and Open GL gaming. It makes a nice first card for those of you who have just enough cash to pick up a new CPU and motherboard, but would like to step up to an AGP graphics card too without breaking the bank.

Here's a rundown of some popular i740 products:

- Real3D Starfighter 8MB (AGP)
- Hercules Terminator 2X/i 8MB (AGP)
- Diamond Stealth G460 8MB (AGP)

Dedicated 3-D accelerators: Voodoo II

Currently, only one kind of dedicated 3-D accelerator is worth purchasing: a board based on the 3Dfx Voodoo II technology. A Voodoo II board won't render in 32-bit color. But they are PCI boards, so you are not required to have an AGP port on your motherboard to take advantage of them. A Voodoo II board is still one of the fastest and most supported 3-D accelerators around, because they offer support for Direct 3D, Open GL and 3Dfx Glide games and simulations. You can also use one or two (coupled together in SLI mode) in conjunction with just about any 2-D or 2-D/3-D AGP or PCI board.

Suppose you love your TNT board, which is blazing fast in Direct 3D, and offers excellent image quality. But you're looking for a means to play combat games like Novalogic's F-16 Multirole Fighter, MiG-29 Fulcrum 3-D accelerated or GSC's F/A-18 Hornet Korea, all of which only support 3Dfx Glide compliant 3-D accelerators. In that case, a 3Dfx Voodoo II-driven product is your only solution. Even if you're running an old PCI ATI All-In-Wonder



What's New in 3-D Hardware Acceleration

or a Diamond Stealth 2000, you can still put a 12MB Voodoo II board into an open PCI slot to improve your 3-D-accelerated gaming performance, while adding the means to run Open GL and 3Dfx Glide titles.

You can also pair two Voodoo II boards together (as long as they're of the same brand) to benefit from Scan Interleave Mode (SLI) mode. This will allow you to beef up the performance even more, while giving you the means to run 3-D-accelerated games at 1024x768. A single Voodoo II board only supports resolutions as high as 800x600 with a z-buffer. In SLI mode the higher resolution is possible. However, I should mention that some titles like Novalogic's *F-16* & *MiG 29* offer 1024x768 modes without z-buffer for single Voodoo II owners.

A single Voodoo II board can be picked up for anywhere between \$110-\$135, and by the time you read this, they may be even more affordable, because Voodoo III-driven products should be hitting the shelves any day now. Here's a rundown of popular Voodoo II-driven products:

- STB Black Magic 3D 12MB (PCI)
- Creative Labs 3D Blaster Voodoo II 12MB (PCI)
- Canopus Pure3D II 12MB (PCI)
- Diamond Monster 3D II 12MB (PCI)
- Metabyte Wicked 3D 12MB (PCI)
- Orchid Righteous 3D II 12MB (PCI)

What's next?

There's already talk of G400 technology from Matrox, TNT2 from nVidia, Savage 4 from S3, and by the time you read this, 3Dfx's Voodoo III-driven products will be on the shelves. Voodoo III is a very promising technology, but it's not that big of a leap beyond Voodoo II. Without going into deep technical specs, I can say that Voodoo III will be as fast as dual Voodoo II boards, and it's a single slot 2-D/3-D solution for both PCI and AGP systems, giving you support for 3Dfx Glide, Direct 3D and Open GL applications with one board.

The AGP versions are also true AGP 2x parts. Since 3Dfx purchased STB in 1998, they'll now be the sole manufacturers of new 3Dfx products. So STB will debut the Voodoo III as the 2000 (AGP & PCI), 3000 (AGP only) and 3500 (AGP only) model boards. Each will offer a little faster RAM (memory) and more extras as you move up to the 3500 model, which will feature 16MB and faster speed, with a maximum supported resolution of 2048x1536, which will set you back about \$250.

The AGP version of the 2000 model will feature 16MB of memory, again at a much faster speed for about \$130. The 3000 model will offer 16MB of memory at even faster speeds for about \$180. 3Dfx claims you'll get 60 frames per second (fps) at 1280x1024, and that they're getting 30 fps on Voodoo III board at 1600x1200 in *Quake III: Arena*, which is pretty impressive.

With image quality only on par with Voodoo II, and with price tags that high, first-generation TNT, Banshee, G200 and Voodoo II boards will no doubt become even more affordable, making them an even more attractive option for gaming enthusiasts over a Voodoo III-driven solution.

Troubleshooting Tips

Once you've picked up your new card, you should really take the time to visit the Website of the manufacturer of your card to download the latest drivers, before installing your new board. Manufacturers like Diamond, Creative Labs, Hercules and STB are constantly updating the drivers for their boards. Sometimes they'll issue new drivers a week after the product is released to keep their products compatible with the latest changes in Microsoft's DirectX or to fix minor things they may have overlooked before shipping. And if you find you're having a problem with a new game or combat simulation, take the time to make sure you're running the latest version of DirectX. Then make another run to the manufacturer's Website, because there may be a quick fix or updated drivers to address an issue you may be having.

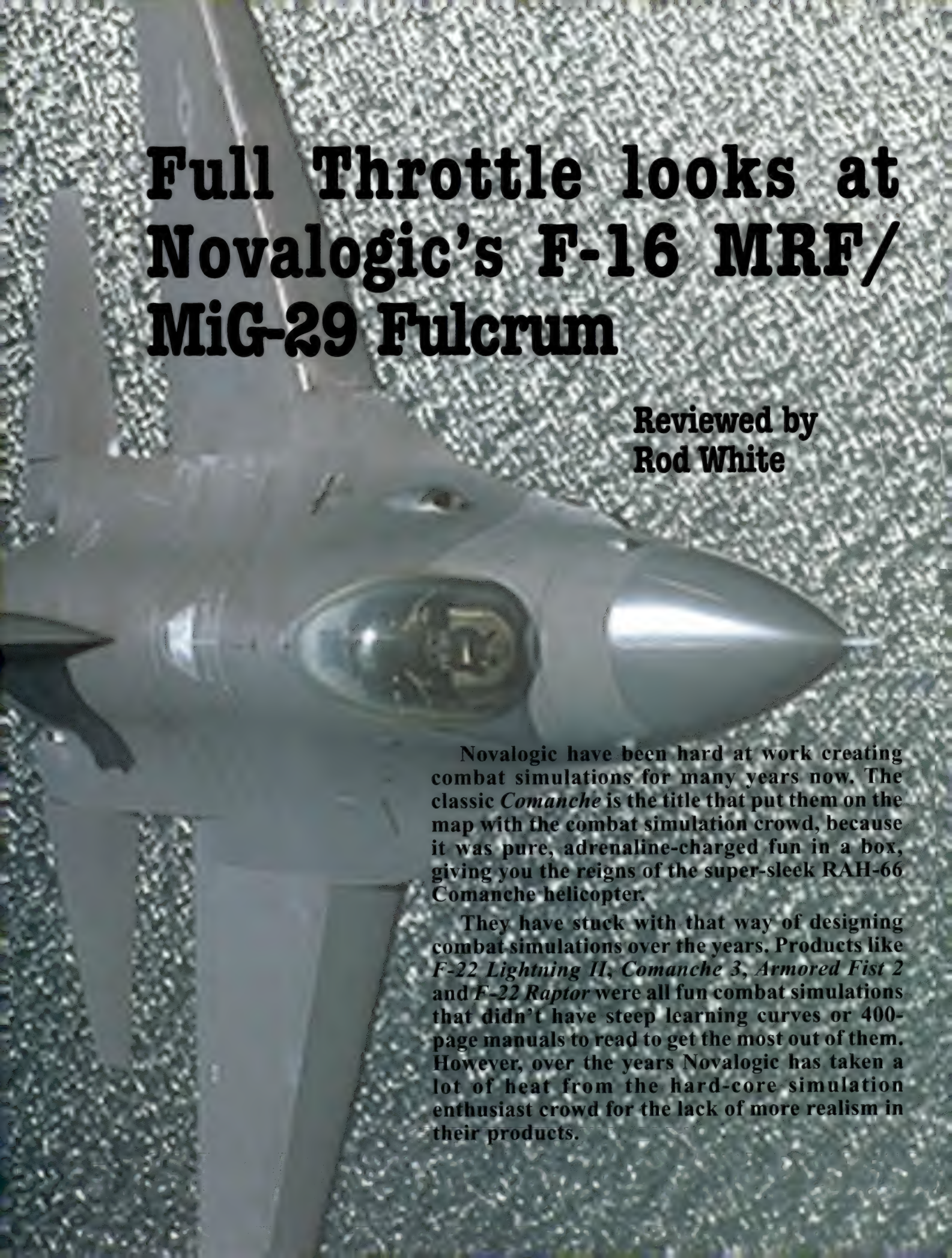
Conclusion

Shopping for a 3-D-accelerator card can be really confusing. I hope we've been able to help cut through most of the techno-jargon to get you the information you're looking for and help you figure out just what 3-D-accelerator solution you need to get the most out of your flight games and simulations. If you have Internet access, I also highly recommend checking out online sites like pricewatch.com, shopper.com and buycomp.com to do some price comparing before making any purchases. Online stores are much more competitive and usually feature much better pricing than the computer super store chains. Most also offer two-day shipping for a reasonable price, and you don't always have to order on-line if you're still not cozy with shopping on-line. The majority of on-line stores out there have an alternative toll-free number for phone orders, so you don't always have to order on-line.

Best of all, to really enjoy your favorite combat and civilian aviation simulations like *Combat Flight Simulator*, *MiG-29 Fulcrum*, *Falcon 4.0*, *WWII Fighters*, *Flight Simulator 98*, *Longbow 2* or even *Sierra's Pro Pilot 99*, about \$100 can purchase your next 3-D-accelerated ticket to Chicago, Baghdad, Europe and beyond. While the latest and most expensive 3-D-accelerator technologies will always be a little faster, or they'll feature some nice whistles and bells, right now the current 3-D-accelerator technologies are still worth looking into before sinking a mint into the very newest 3-D-accelerator technology. Besides it's always wise to wait and see how compatible and worthwhile the newest technology is before picking up new products based on them, because chances are you'll regret it a few months down the road when that new product you wanted is 30%-50% less, and much more compatible.

Happy accelerated flying!





Full Throttle looks at Novalogic's F-16 MRF/ MiG-29 Fulcrum

**Reviewed by
Rod White**

Novalogic have been hard at work creating combat simulations for many years now. The classic *Comanche* is the title that put them on the map with the combat simulation crowd, because it was pure, adrenaline-charged fun in a box, giving you the reigns of the super-sleek RAH-66 Comanche helicopter.

They have stuck with that way of designing combat simulations over the years. Products like *F-22 Lightning II*, *Comanche 3*, *Armored Fist 2* and *F-22 Raptor* were all fun combat simulations that didn't have steep learning curves or 400-page manuals to read to get the most out of them. However, over the years Novalogic has taken a lot of heat from the hard-core simulation enthusiast crowd for the lack of more realism in their products.

They were also way ahead of the competition when it came to smooth on-line gaming, because they launched F-22 Raptor with Raptor Air war (RAW)—a free on-line gaming service running on Novalogic's own servers over the Internet—for owners of F-22 Raptor. It allowed up to a hundred players to fly in the same world at the same time in team vs. team and head-to-head scenarios.

Building upon the same technology

This latest offering from Novalogic taps the same on-line gaming technology used in *F-22 Raptor's RAW* and finally incorporates 3-D-accelerator support for 3Dfx Glide-compatible graphic accelerators. Since they have a strategic alliance with Lockheed Martin, it is not hard to guess what fighter aircraft they chose to simulate this time around. Although we already have been in F-16 territory over the years, the *F-16 Multirole Fighter (F-16 MRF)* simulation of the F-16 Fighting Falcon is much simpler to get into than most of the others, like Microprose's *Falcon 4.0*. The other aircraft modeled in this bundle is the *MiG-29 Fulcrum*, which is one we have not been able to enjoy flying since the *MiG-29* add-on for *Falcon 3.0* years ago. Best of all, both *F-16 Multirole Fighter* and *MiG-29 Fulcrum* are bundled together for around the same price of one single combat simulation.



The F-16 Viper (above)

Cockpit detail of the F-16 (below)



Cockpit detail of the MiG-29

The aircraft models

To model the F-16, the Novalogic designers called their friends at Lockheed Martin to help them create the flight characteristics of the Viper. They worked closely with their test pilot, John Fergione, during their development of the F-16 physical and flight models. Novalogic also called upon the talents of Russian MiG-29 test pilot/cosmonaut Yuri Prikhodko to model the MiG-29 Fulcrum.

When deploying or firing weapons from the cockpit of either aircraft, the dynamic stability is affected in a very realistic way. When firing a missile or dropping a bomb from under the right wing, the aircraft will suddenly roll a little to the left, and *vice versa*. After expending ammo, or when beginning to run low on fuel, you also notice the aircraft handles a little more responsively. The effect of stressing the airframe is also modeled for both the F-16 and the MiG-29. Although they have not modeled the F-16 nearly as realistically as Microprose did in *Falcon 4.0*, or as SSI modeled the Su27 Flanker in *Su27 Flanker 1.5*, they have added more realism to *F-16 MRF/MiG-29 Fulcrum* than any of their previous products.

It's hard to stall the planes, you can land the planes at ridiculous speeds, and the rudder input appears a bit exaggerated, but it's a great deal of fun flying either plane in the single missions or on-line against human opponents, if you can overlook those faults. They certainly won't be winning over the hearts of the serious hard-core combat simulation enthusiasts looking for the realism you'd expect to find in *Falcon 4.0* or Jane's *F-15*. On the other side of the coin, this lack of more attention to detail makes both the F-16 and MiG-29 aircraft very accessible simulations for the casual simulation enthusiast. And the package can still be a product that the hard-core enthusiasts can enjoy, if they are willing to overlook what they lack in pilot workload and flight modeling.



The MiG-29 aircraft detail (left and below)



The gameplay

You'll find 40 missions of single-player action in each product. *MiG-29 Fulcrum* features campaign scenarios taking place in the Kuile Islands, Uganda, Somalia & Ethiopia, Burma (Myanmar) and Tajikistan. For the *F-16 Multirole Fighter*, you will find campaign scenarios taking place in Serbia, Liberia/Sierra Leone, Democratic Republic of the Congo, Burma (Myanmar) and Somalia & Ethiopia. The terrain is a variety of snow, desert and jungle regions, depicting both day and night missions, and with 3Dfx each campaign region looks sharp and detailed.

The missions themselves are fun, and they get you right into the action, because the overall size of where each conflict takes place is not that big. This is a plus for mainstream and casual simulation enthusiasts that are not big on flying for 10-15 minutes to reach the mission objective. On the flip side, it's the kind of thing a more hard-core simulation enthusiast will frown upon, because they'd rather take on the challenge of flying undetected for 10-15 minutes in between waypoints.

Both simulations use an in-depth scoring system, which takes many things into account. Completing the mission, having your wingman survive, achieving each mission goal, and landing successfully play a very important part. Also, short- and medium-range missile success rates, bombing success rates, the skill level of enemies you killed and the percentage of your airframe that's intact when you complete the mission are all determining factors in your overall mission score.

Before taking flight in both simulations, you can read the briefing and access a Loadout and Map screen. On the Map screen, you can drag the turn points around on the map. In the Loadout menu you can modify the loadout or you can go with the default settings. You can also choose between Normal and Double Modes. Selecting Double Mode allows you to carry twice as much ordnance, without taking twice the weight with you in-flight. This is a nice cheat allowing you to carry more firepower without weighing the plane down. A Skip Mission selection can also be used after you've unsuccessfully completed a mission, when you would like to move on to the next one without replaying that same one again.

Lessons in what can go wrong

You'll also learn that many things can go wrong online and in solo missions during flight. You may discover your MiG-29 is beaten so badly that it's barely flyable. With the keyboard you have a way to control the throttle for each of the MiG-29's engines independently — on more than one occasion you may have one or both engines completely blown out. In the *F-16*, you may find your HUD damaged to the point that it will not function, and other

on-board systems can be damaged so badly in both simulations that you may not be able to fire missiles or drop ordnance.

Navigation and targeting systems

Novalogic models the F-16C equipped with the LANTIRN (Low Altitude Navigation and Targeting InfraRed for Night) system. To help utilize LANTIRN they've included a small tutorial in Adobe Acrobat format on the CD. If you pay close attention, you will also notice that they even model the proper HUD, which is actually different from the average F-16C HUD. In *F-16 Multirole Fighter* they've modeled six different radar modes.

- ➔ Two are air-to-air modes:
 - ➔ Air Situational Awareness Mode (SAM A-2-A)
 - ➔ Air Combat Mode (ACM A-2-A)
- ➔ The other four are air-to-ground modes:
 - ➔ Ground Situational Awareness Mode (SAM A-2-G)
 - ➔ Fixed Target Track Mode (FTT A-2-G)
 - ➔ Ground Moving Target Mode (GMT A-2-G)
 - ➔ Ground Mapping Mode (MAP A-2-G)

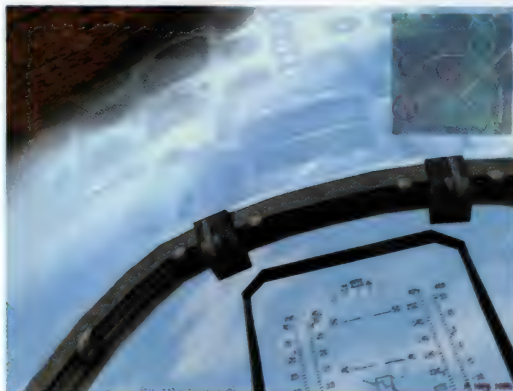
Sadly, they only model the part of the LANTIRN system that assists the deployment of electro-optical weapons. It manually LASER-targets objects and allows you to see them at night. What they did not model is the other half of the system, which would have included the Terrain Following Radar.

In the *MiG-29*, the technology you will be relying on is a little different. You use the InfraRed Search and Track system (IRST), in addition to the N-019/RP-29 pulse Doppler radar, which allows you to see as far as 148km. With the IRST you rarely have to use your radar to track threats as far out as 74km. You can also rely on information downloaded to your onboard computer by the Mainstay Airborne Early Warning and Control System (AEW&C) aircraft, but it's present in many of the *MiG-29 Fulcrum* solo missions only.





The inner cockpit detail reflects off the inner canopy (left and below)



Multiplayer features

Both the *MiG-29 Fulcrum* and the *F-16 MRF* feature rock-solid multiplayer options. They support modem, IPX LAN (up to 16 players), serial, Internet IP to IP (up to 16 players) and Novaworld IBS games with selections for Deathmatch and IBS RAW. I think it is kind of silly to call these RAW games, because RAW originally stood for "Raptor Air War," and they don't yet feature *F-22 Raptor* over IBS in games with *MiG-29 Fulcrum* & *F-16 Multirole Fighter*.

They still run separate RAW servers for *F-22 Raptor*, but it can't mix it up with these two simulations in IBS yet. With that said, IBS RAW games with these two simulations are fantastic! You can log into the IBS servers from within each simulation's Multiplayer menu. One there you have the choice of using the mini-browser that's built into each game or you can use your default Web browser to connect to IBS servers.

The first time you log in, the games will look for updates, and more than likely you'll automatically begin to download some new files, which are put in the right places. Once the update completes, the game will restart. Then you can log in, updated and ready for action.

Up to 128 players are supported by IBS RAW each server, and 32 are supported on the DM ones, but I've only experienced games with around 32+ players at one time, which was extremely smooth. At times it's so smooth you forget you are playing the simulations over the Internet!

The IBS RAW games consist of two sides playing a scenario in which both teams must attack the opposing force's base, while defending your own from attack. Once one of the sides has achieved the objectives, which usually consists of destroying the other side's base, then the scenario is won and the next one begins. Each side is also given an AWACS to protect and provide radar coverage. Also nice is that there is more than just one map to play out these scenarios on, which gives the IBS RAW games a degree of variety that makes logging in to play fun, because you don't always know what scenario will be up and running.

The actual teams feature both MiG-29s and F-16s on the same side, so it's not just a scenario of MiG teams Vs. F-16 teams, but that would be fun. When you get tired of flying the MiG-29, you

can log in with F-16, and *vice versa*. Once you've logged in with either simulation you are given the choice of being a fighter or a bomber. Making this selection determines the weapons loadout you are given. Bombers get bombs and SRMs (if the server allows it), while fighters get MRMs & SRMs.

Playing over the IBS RAW games on-line is a blast, but modem play is not very good with just two players. There is no cooperative multiplayer support for allowing you to play as a team against the artificial intelligence in the single player missions. Head-to-head play with two gamers gets boring *very* fast. It is really hard not to have a great time over the Internet on the Novalogic servers using just a lowly 56k-

modem connection to the Internet with up to 32 players at once. As it stands, IBS is exceptionally stable and smooth. There is nothing else out there like IBS RAW games that are free to play. And nothing else out there can come close to comparing to the large-scale battles that they host 24 hours a day, seven days a week for *free*.

Conclusion

This package is definitely not for everyone. The hard-core crowd will frown upon it for what they feel it lacks in realism, yet I've got a notion that even they will enjoy the excellent on-line multiplayer support. On the other side of the coin, this is by far one of the easiest combat simulations that you can jump into and fly, without reading the manual. The small areas of conflict make the majority of your playing time action packed, because there's not always a lot of distance between you and the enemy. And it is understandable that most of us are already burned out on F-16 Fighting Falcon simulations. However, when purchasing *MiG-29 Fulcrum*, you are almost getting *F-16 Multirole Fighter* for free, because this bundle costs about as much as one single simulation, and you get two boxed simulations, complete with their own manuals and keyboard reference cards.

Both titles look fantastic running on a 3Dfx Glide-compliant graphics accelerator, and resolutions as high as 1024x768 are supported on a single 12MB Voodoo II card. In the cockpit, the detail of each plane is truly superb. If you look closely you can even see reflections of the cockpits on the inside canopies of both planes, and you can use your mouse to click on areas of each one for a closer look. Visually, they've done a great job all around, and my only complaint is that the enemy aircraft aren't as graphically stunning as the F-16 and MiG-29. That aside, it's a fantastic looking product all around.

F-16 MRF/MiG-29 Fulcrum



Night navigation and targeting instruments of the F-16



Novalogic have also issued an update that addresses an issue 3Dfx Banshee board owners were having with the product. You can download the update directly from their Website at <http://www.novalogic.com>.

If you're into on-line multiplayer games and simulations, there's no question about it: get this bundle! There's really nothing like the challenge of facing a human opponent or hordes of them in combat, and this bundle gives you two very unique planes to take into combat over Novalogic's free on-line gaming service. Of course, you'll require an existing Internet Service Provider, but once you log into Novaworld's Integrated Battle Space servers, hours will pass you by like nothing. It's really that much fun and addictive.



F-22 Lightning III

In May Novalogic plans to release *F-22 Lightning III*, the sequel to *F-22 Lightning II*. Like *F-16 MRF* and *MiG-29 Fulcrum*, *F-22 Lightning III* will not be the hard-core combat simulation enthusiast's dream come true, but it will once again have very impressive features that will entice most of them to give it a spin. This time around you'll have the means to carry tactical nukes into battle to level entire cities!

Changing weather effects will include rain, snow, hail and wind, and they claim that the extreme temperatures will affect the flight performance. As one might expect, these variations will be compounded by changes in altitude and corresponding atmospheric pressure. To pull off the visuals, this time around they'll support both Direct 3D- and 3Dfx Glide-compliant graphics cards.

F-22 Lightning III will also debut their Voice-Over-Net technology, giving players the built in ability to talk to each other over the Internet while playing over Novalogic's servers. Other features will include force feedback joystick support and the ability to customize the aircraft with different paint schemes. The product will ship with 50 single-player missions. Keep checking with us for more on *F-22 Lightning III*.



AIRPORT

VOLUME 1

2000

**Reviewed by
Phil Pashutine**

For Microsoft® Flight Simulator 98

According to Wilco's promotion for **Airport 2000**, a new add-on for Microsoft Flight Simulator 98, there will be "No more approximate, lifeless representations of your airports. No more lone departures and arrivals in deserted terminals. No more generic instrument panels and simplistic adventures." After the beautifully rendered *Tahiti* scenery package, it seems that Wilco has done it again. Their all-Belgian design team built seven photorealistic airports for *Airport 2000*, plus nine adventures and eight airplanes.

Installation

Depending on your selected installation options, the setup program will install the scenery, planes and adventures. You'll use a specific installation procedure if you already have the *Europe 1*, *Europe 2* or *Tokyo* add-on packages. All other airports use the booster files.

Manual and Charts

The manual covers everything you need to know: installation, adventures, cockpit layouts, ready-made flight plans for the nine adventures, an aircraft speed reference chart, and even the history and future development of each airport. This manual is not included

just to add weight to the box. Some users on the news groups have complained that the adventures do not work. However, you shouldn't have trouble if you take time to read the manual, jot down all the adventure shortcuts and other important information before you start an adventure.

Each airport comes with its own set of Instrument Approach Procedure (IAP) and Standard Instrument Departure/Standard Terminal Arrival Route (SID/STAR) charts. Of course, not all the IAPs for any one airport are included, but this is no problem—additional IAPs can be found almost anywhere. Unfortunately, charts stuck in the middle of a manual are little help (though this is not a problem specific to Wilco). Airport charts and IAPs are meant to be used and should be in a loose-leaf form or in an appropriate high-resolution image format on the CD, so that users can print them.

Aircraft and adventures

No flight simulator software would be complete without planes and adventures. The planes in *Airport 2000* have photorealistic panels.

Includes Airport Charts & Maps

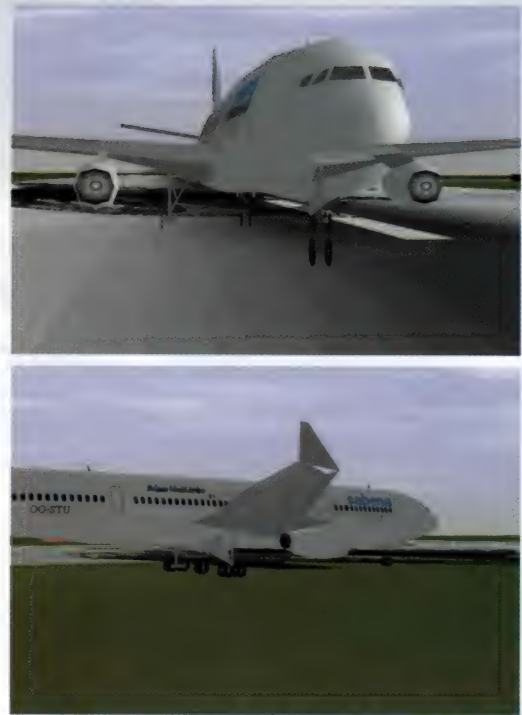
A Look At Airport 2000



Highly realistic instrument panels

The panels of the Airbus A320-A340, the ATR42 and the McDonnell-Douglas DC-10 can also be seen from the jumpseat, but for some reason the jumpseat view is at an angle and needs to be adjusted to eye level. The jumpseat view is a bitmap, so you cannot use any instruments and can only set COM and NAV frequencies. Flight parameters such as compass heading, altitude and airspeed are displayed at the bottom.

Many of the panels include new functions: wind shear alarm, radio altimeter messages, glideslope and localizer alarms, minimums message, excessive rate of descent audible warning, configuration errors audible alarms, low-fuel warning and background chatter. You can even hear a stewardess' cabin announcements! Several of the planes include linear type gauges. Some flight simmers may not think too highly of those "photorealistic" panels, while others will think the contrary. What matters is the readability of *all* the gauges, and most of the planes in any add-on package have not met this simple requirement. According to my 777 manual, the autopilot/flight computer layout is quite different. Flight Simulator, however, has its limitations, and perhaps the gauges cannot be rearranged to match the original layout. Some of the aircraft displayed see-through problems, but I will not comment further on this, as I am not an aircraft designer.



Some aircraft showed visual bleed-through problems

Adventures can be fun, especially when you know that a real pilot has made them. Serge Baye is an old hand at this. He proved his programming skills for the Wilco *Tahiti* adventures, and he is getting better and "nastier" with each new title. Each adventure is programmed according to instrument flight rules. All messages must be acknowledged. Some voices from Air Traffic Control (ATC) have a charming, female, French accent—"Oh la la!"

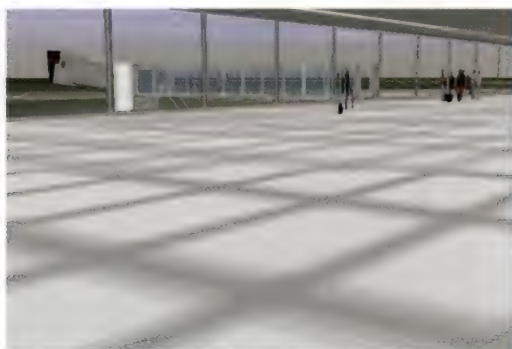
When you start an adventure, you will be asked if the messages should be printed on the screen or announced vocally. If you require the help of a copilot, "Jack" will set up your COM and NAV frequencies and run through the checklists for you, as well as remind you to tune in to the Automated Terminal Information Service (ATIS). Since all these flights are virtual and do not follow a strict block departure time, you will then be asked for the time of departure (dawn, day, sunset, night), and a weather engine will generate random weather so no two identical routes will have the same weather. If you believe that your flight can be uneventful, then be ready for an adrenaline boost as you experience an engine and/or instrument failure! You can even dump fuel. The probability of a failure is 0.5% to 1%, and I did not experience any during the test flight.

You will be happy to learn that you can adjust V1, Vr and V2 takeoff parameters. Ever followed official procedures? Well, now is your chance. I only tested this on one adventure.

A Look At Airport 2000

Static and dynamic scenery

This is the *pièce de résistance*. *Airport 2000* includes photorealistic buildings. There is no incompatibility with other commercial add-on packages, as the appropriate exclude files are copied during the install process. (If you use *Europe 1* and *Europe 2*, make sure that the default FS98 Europe boosters are not active!) *Airport 2000* is a visual delight for the slew-mode addict. If you peek inside some of the terminals at Charles de Gaulle Airport, you will see the passengers, and you can go inside the glass walkways.



View from inside glass walkways

Or you can see the “oversized” vendor in her shop.

For another inside tour, visit LAX.

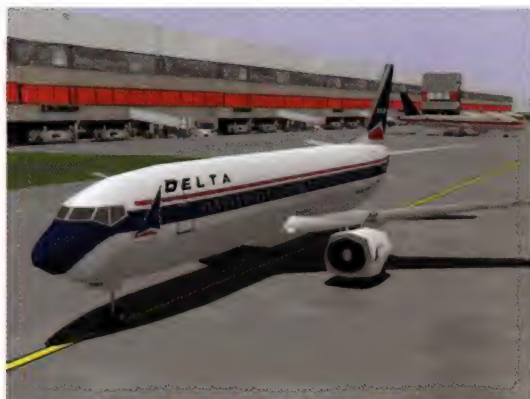
When you arrive at Charles de Gaulle Airport, you wonder where the taxiways and tarmac have gone to, as all you see is a low-resolution texture made from a satellite image. As soon as you get below a certain altitude, the textured polygon tarmacs and taxiways appear. This design technique saves the frame rate and gives you a nice, realistic airport view from above.



Low-resolution satellite-image textures are replaced by high-resolution textured polygons as you approach Charles de Gaulle Airport.

Some will raise the issue that there is no scenery detail outside of the airport grounds. Just as in Aerosoft's German airport series, you only have the immediate airport perimeter, period. Unless you have the latest Cray computer, you cannot have both photorealistic highly detailed airports *and* detailed surroundings. The scenery *should* have the obstructions 10 nm from the runway touchdown zone, and there are none in *Airport 2000*.

Instrument Flight Rules (IFR) enthusiasts, such as myself, will appreciate landing and then exiting towards photorealistic terminals following the guide lines (black underlay with yellow strip on top).

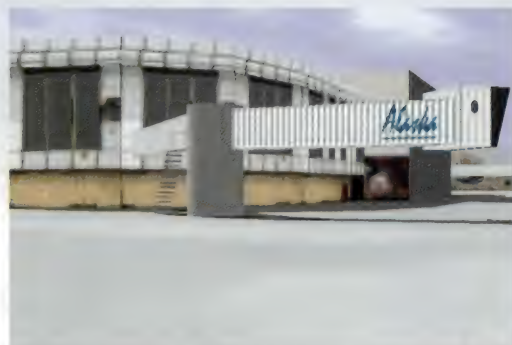


A Look At Airport 2000



Excellent, realistic terminals at Brussels/Zaventem Airport and the Lufthansa Cargo building at Frankfurt

In some cases, the lines turn at very sharp angles. If you have a slow computer, you can change scenery complexity settings so that some of the buildings and static planes will not show, and your landing should be smooth. Upon landing, just switch back to the "Very Dense" setting. With all the many runway and taxiway signs, it is nearly impossible to get lost. Some of the airports feature docking systems, run up and stop positions.



LAX - Aloha Gate

All airports are real visual delights, and if you happen to be a designer, you will want to add your personal touch.

Some of the dynamic objects seem to behave oddly. If you see a heavy jet turning outside the yellow line or running over grass, it is because you are in 3/4(zoom) view. I was told that the dynamic library is not part of the FS scenery and that the dynamic object should always be looked at from behind/front. The general feeling is that the airport is alive so you will have to be on the lookout for taxiway and runway traffic.



Dynamic objects are prominently featured in Airport 2000

Some minor problems

Paris has some minor texture joint problems, and one of the runways seems offset compared to the underlying satellite-image texture. A few of the building textures are a bit on the fuzzy side. And one 3-D object feature that is conspicuously absent is the trees! All the planes except the ATR use the default 737 sound. The ATR uses the Learjet sound. And finally, I make an appeal that the next *Airport 2000* release will include more than just seven airports.

A Look At Airport 2000

System performance

Surprisingly, the frame rates remained good (14-60 fps, depending on scenery density settings). I did not experience dramatic drops in the frame rate and all my landings were smooth. This is due to two factors: first is the P400 I have with 16 MB video memory on a 3Dfx card and second is that the design technique has much improved, only loading objects into the scenery display buffer when necessary.

Conclusion

Airport 2000 is a very worthwhile Flight Simulator 98 add-on. Whether you're a slew-mode addict or an IFR nut, all will be pleased.

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5370 52nd Street SE Grand Rapids, MI 49512

New from Precision Manuals Development

FS98 Series 747-400 Aircraft Operating Manual

Reviewed by Jim Rhoads

FS98 is unique in that you can fly almost any aircraft you can think of, and most of them are readily available for download from the Internet. These range from very light and easy-to-fly aircraft to very complex heavy jet transports.

Have you ever been flying a heavy and wondered why you never reached your destination when you should have had plenty of fuel? Or brought one in on the approach and it seemed like you were not as in control as you thought you should be? Maybe you were just having a bad day, or maybe you were not flying it by the numbers!

Precision Manuals has introduced the first in an extended line of aircraft-specific operating manuals to help you fly like a professional. Each manual contains an almost exhaustive amount of data and includes an FS98 .air file that offers you the "Highest fidelity 747-400 flight model experience possible within the limitations of FS98."

The package

The FS98 747-400 Aircraft Operating Manual (AOM) package is a download-only package available from the Precision Manuals Web site. I initially did not like the idea of this, because I envisioned it as a soft- or hard-back manual that I could keep at my side to reference the 747 flight regime. Precision Manuals has made the manual available in Adobe Acrobat Reader format that is set up to print double sided if your printer supports this option. This allows you to print front and back in a book form, allowing approximately 80 double-sided pages instead of 160 single ones. If you do not already have it, you will also need to download the free Acrobat Reader program to read and print the material.

Precision manuals conveniently links you to the Adobe Web site through the readme.txt included in the main .zip file. Printing out the manual and using the three-hole punch

did not take as long as I thought it might, and putting it in a hardcover three-ring binder added the finishing touches to the manual and gave me what I wanted. And at a price of \$11.95, I did not mind the little extra work.

Manual Layout

I found the layout of 747-400 manual to be very well done. Its documentation is thorough, comprehensive, detailed and presented in a very logical, practical order. The registration/ownership information page keeps track of your registration number and shows that the manual was well thought out with end user in mind. Other pages consider FS98's significant weaknesses in respect to realism, with tips that allow you to fly the sim as realistically as possible within FS98 limitations.

The manual displays various tables based on flap settings/type of runway (clean/dry, wet/cluttered) and then gives you the correct V1, Vr, and V2 settings based on the aircraft weight configuration.

Many other tables are also included, such as:

- Takeoff thrust settings
- Takeoff speed adjustments
- Allowable takeoff crosswind component
- Fuel load planning
- Maximum and optimum cruise altitudes
- Minimum maneuvering and landing reference
- Go around thrust settings
- Limit weights
- Performance requirements and limitations
- Emergency equipment
- Speeds



FS98 Series 747-400 Aircraft Operating Manual

The 747-400 manual also features a section on flight techniques that instructs you in the normal routines involved in handling the 747-400, such as:

- ✈ Ground taxi operations
- ✈ Takeoff procedures
- ✈ Climb-out procedures
- ✈ Cruise procedures
- ✈ Descent procedures
- ✈ Approach procedures
- ✈ Landing procedures
- ✈ Miscellaneous flight techniques

The Test

The 747-400 AOM, as stated before, comes with its own .air file for use with a 747 in FS98. You will need to have a 747-400 aircraft already installed or find one from the many that are available for downloading from the Internet.

Then go into the folder that contains the .air file for the selected model (example: C:/FS98/aircraft/747-400) and rename the existing .air file with a .bak extension (example: 747-400.air to 747-400.bak).

Then rename the included .air file that comes with the 747-400 AOM to the name of the original file (example: pmdg7474.air to 747-400.air).

Now the aircraft will use the renamed .air file to reference the flight characteristics from the 747-400 AOM. If you ever want to return to the original model, just remove the existing .air file and rename the one that you saved with the .bak extension to an .air extension.

Sound complicated? It is not, really. Just remember what you did and you will do fine.

I actually used both the original and the 747-400 AOM .air files independently, as a test for my own comparisons.

When following the manual perfectly, the 747-400 AOM flight model performs right on the numbers, as claimed. Assuming that this model is based on the real numbers

supplied by the actual airplane and the training departments of three major airlines as claimed, then this is quite an accomplishment for an FS98 flight model.

I must be honest though, and tell you that I really expected an overall different "feel" from the model.

Although the numbers are correct, it did not feel like what I was expecting. It felt much lighter and more responsive than I had anticipated and seemed a bit less manageable as well.

Don't get me wrong, it still flies very well, but differently than I expected, which could be attributed to my joystick sensitivities within FS98 and the limited time I spent with the model. It might have been beneficial to include recommended joystick sensitivity settings in the manual to help insure a standard for the flight model.

I also tried the 747-400 AOM on the original model and found that the numbers were very close. This flight model could be used with many other high-quality 747-400s that are available online.

Conclusion

If you are a fan of heavy jets or belong to a virtual airline and want to fly these big dogs accurately, then the 747-400 Aircraft Operating Manual is an absolute must-have item. It is very professional, extremely well documented, and available at a very modest price (\$11.95).

Precision Manuals expects to cover many more heavies very soon, and several should be done by the time of this writing. I would love to see them expand to not only cover the heavies, but possibly even business jets and commercial twins. Precision Manuals is owned by a person you just might recognize, long time flight simmer and aircraft designer Robert Randazzo.

Aircraft Operating Manuals have been sorely overlooked in the flight-sim market place. With the lack of a true "measuring stick" in anything we do, we can only guess at best. And guessing isn't a good solution when you're flying something as big as the First National Bank at 500 miles per hour.

For More Information

Precision Manuals Development Group
<http://www.precisionmanuals.com/>



A Preview Of Custom Panel Designer

Chuck Dome Reviews A New Abacus Product

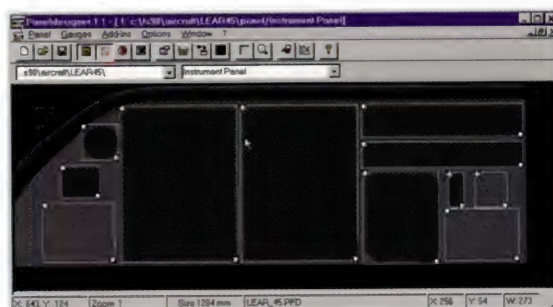
Anyone who has tried to create a new instrument panel for FS98 or significantly modify an existing one must have been impressed by the tediousness of the job. Although Microsoft did make panel.cfg an easy to edit text file, the actual process of panel construction can be painstaking. With the new **Custom Panel Designer** from Abacus, however, most of that hard work is a thing of the past. This tool is sure to be a hit with both rookie and veteran panel designers. Having tried it myself, I can't imagine ever again doing serious panel work without it.

The pre-release package I received for this review contained one CD-ROM disk in a protective paper sheath and a paperbound instruction manual. The manual is easy to read and contains all the pertinent information a user might require. One of the things that I look for in any piece of software is whether it is "intuitive." That is, does it work in a way that makes sense? Or does it call for a lot of reference to the manual? I must say that Custom Panel Designer (CPD) is very intuitive. It works the way it "ought" to work.

Installation was very simple and straightforward. As with many setup programs, I just indicated the folder into which I wanted the files copied. The installation software did all the rest, with no glitches. Since my c: drive (where FS98 is) was pretty full, I placed CPD in a new folder on my d: drive. This particular setup has never caused any problems. The program runs completely from the hard drive and, after installation, the CD is no longer required.

Upon first running CPD, a dialog box asked me to enter the "root" folder of FS98 (mine is c:\fs98) and the complete path to my favorite paint program. I had to look up the latter by checking the Properties of the desktop icon. The full path turned out to be c:\corel30\photopnt\corelpnt.exe. In an optional text box, the user can enter any author/copyright information to be saved in panel.cfg files. This configuration information only needs to be entered once, though it can be easily changed from the program's **Options** menu, under **Properties**. After I successfully entered the paths and my name, the main user interface appeared and I was ready to go.

As a simple exercise, I decided to open the default Learjet panel and fool around with it.



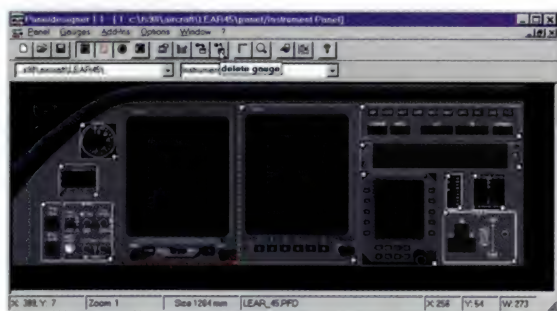
"Fit Panel to Window" function

I clicked a button labeled "Fit panel to window" and maximized it. All it showed at this point was the panel's background .bmp and several white rectangles



A Preview Of Custom Panel Designer

representing the outlines of the existing gauges. I next decided to click the button labeled "Display gauge bitmaps."

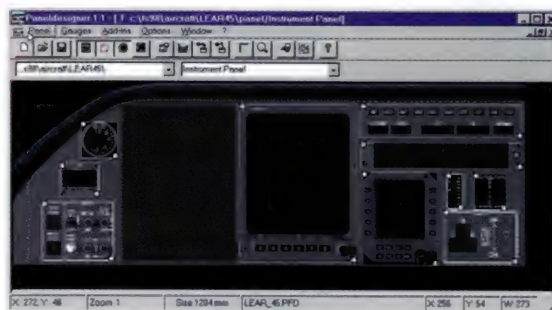


"Display Gauge Bitmaps" function

Only the main background bitmap was displayed for each gauge. Having some knowledge of the structure of .gau files, I appreciate how difficult it might be to display all of the bitmaps within a gauge at once. There is a feature in CPD, available when selecting new gauges, that allows one to view each bitmap in a .gau file. For purposes of placing and sizing gauges, however, the main background bitmap should be enough of a visual aid.

Continuing my simple exercise, I decided to modify the default Learjet panel. Each white rectangle has small squares at its upper left and lower right corners. Clicking either one will select the enclosed gauge for modification. Dragging the upper left square moves the gauge around on the panel, and drag the lower right square to re-size the gauge. Numbers at the bottom of the main window indicate current X, Y and W (width) coordinates. Once the gauge has been moved and sized, clicking anywhere outside the small squares de-selects the gauge and anchors it in place. This system allows for extremely easy placement of gauges. This feature alone would make CPD worth the price.

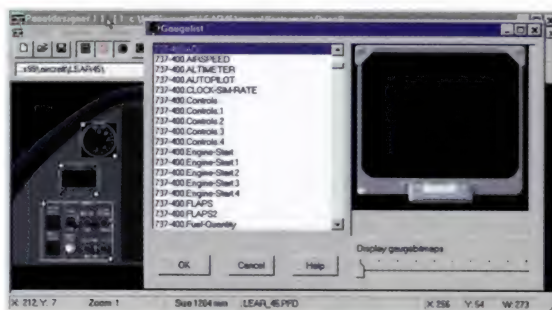
Clicking a white square around the Learjet's PFD gauge changed the rectangle to red, indicating that it was now the selected gauge. I wanted to replace this gauge with the 737's ADI, but first I tried a little experiment. Instead of pulling down the **Gauges** menu and selecting **Delete**, I simply hit my keyboard's **[Del]** key. A little dialog box appeared and asked if I wanted to delete the PFD gauge. I clicked **[YES]** and it was gone.



Lear PFD gauge removed

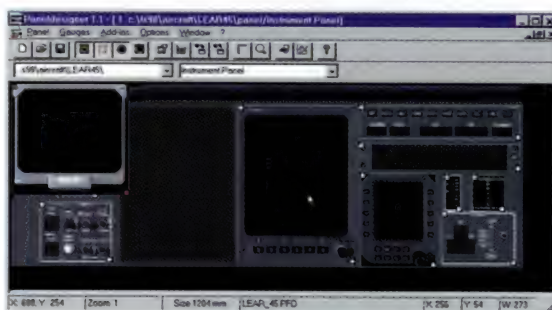
This is a good example of the "intuitive" nature of the CPD interface.

To replace the PFD, I began by clicking the **Gauges** | **Insert** menu command. I later found that pressing **[Ctrl]+[Ins]** would have the same effect.



Gauge selection window

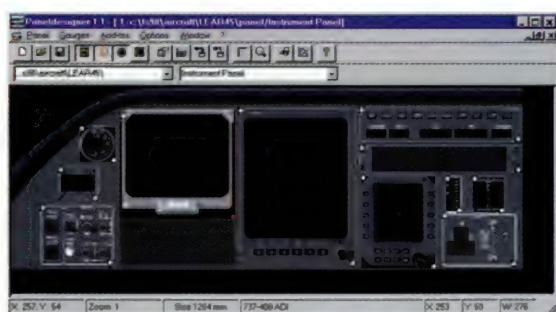
I could easily scroll through all of my FS98 gauges using standard Microsoft Windows procedures, such as typing the first letter of a gauge's name. After quickly finding and selecting the 737 ADI, it appeared at the upper left of the panel (position 0,0) inside a red rectangle.



737 ADI gauge

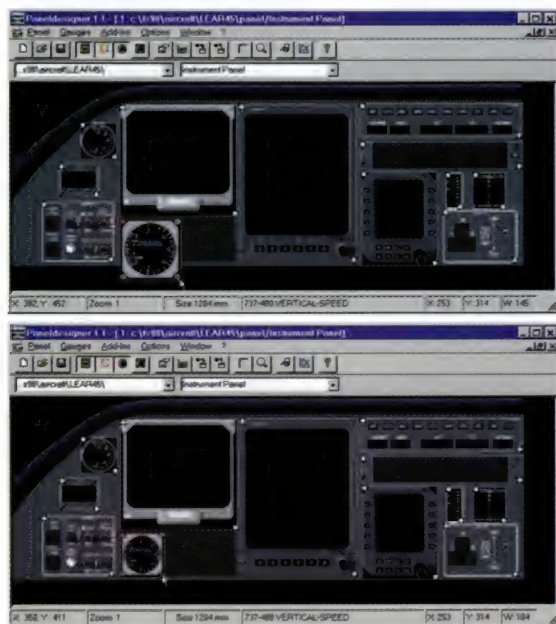
It took hardly any effort to drag it to where the Learjet PFD had been.

A Preview Of Custom Panel Designer



The new gauge in place

Next, I had to face the fact that I was missing some important gauges as a result of replacing the PFD. Accordingly, I quickly added the 737's vertical speed indicator just below the ADI and sized it.



Add the 737 vertical speed indicator

In less than a minute, I also added the 737 RMI gauge just to the right of the VSI.

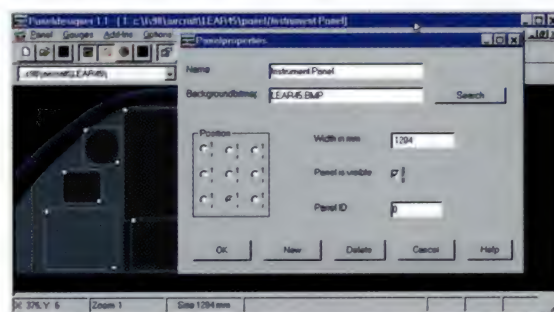


737 RMI gauge added

It may not be the best panel I've ever done but, hopefully, it demonstrates just how easy CPD is to use.

Until this point, I had only been fiddling with an existing panel. It was now time to discover how easy it might be to create a brand new panel. Without even thinking about referring to the manual, I pulled down the **Panel** menu and clicked **New**. I was immediately presented with a list of all my FS98 aircraft. Certainly, I thought, it makes sense that a new panel must be associated with an aircraft. Just to play it safe, I chose LEAR45. A dialog box asked me for a new aircraft name and even suggested the name *Learjet 45 2*. After I entered that name, a plain gray rectangle appeared with the words "No Picture" emblazoned on it. This was apparently the default background .bmp.

With no trouble at all I chose a more interesting background. This was accomplished with the help of the "Window options" button.



Impressive options for background panel .bmp images

The options include: entry of a new window title, choice of nine window positions, width parameter, panel visible option and an ID number for the window. After entering the appropriate information, I clicked the "Save panel" button then exited to go and find my new panel.

To be truthful, the first time I looked I found the new panel.cfg file was blank. It didn't take long to discover that the reason was that I had forgotten to enter a window ID number. I went back and entered a zero for the ID, saved the panel, and again checked the .cfg file with a text editor. Lo and behold, there it was in a new subfolder called \lear45\panel.0. All the panel information had been saved, along with my name as the creator. There was even a default set of extra 8-bit colors. As expected, there was also a new entry in the aircraft.cfg file listing the second Learjet and pointing to the new panel subfolder. I was impressed! With a little more experimentation, I discovered that it was easy to add more windows to the same panel. By this time, I was hooked. For me, panel design would never be the same.

Before I forget, there is at least one more very impressive option available in CPD. The "Default view setting" button brings up a window that allows the user to precisely set the size and shape of the exterior view.



A Preview Of Custom Panel Designer



Size and shape of the exterior view window may be set

The effect it has on the panel.cfg file is to set the X=, Y=, SIZE_X= and SIZE_Y= parameters at the end of the file under "Default View." I have communicated with several otherwise competent panel designers who are quite mystified by these numbers. CPD eliminates any difficulties with these parameters by calculating them for you. Simply adjust the four sliders until the exterior view looks correct, then save the result. With features like this, virtually anyone can now create expertly designed panels.

By now, it should be obvious that I really like CPD. To be objective, however, I tried to find something to criticize. Believe me, it was difficult. About the only drawback I could find involved applying it to Microsoft's Combat Flight Simulator (CFS). Abacus has advertised CPD as being "for Microsoft FS98 and CFS." I asked myself if CPD really does work with CFS, and after some experimentation, I decided the answer is "yes and no." First, you need to configure CPD to find your CFS aircraft, panels and gauges. The trick is to put a copy of fltsim98.exe in your CFS "root" folder. Otherwise, CPD won't recognize the folder as a legitimate path for panel design.

Even after configuring CPD to work in CFS, it has some limitations. For one, it doesn't seem to know how to add some of the extra configuration lines often found in CFS panels. These include: file_1024=, window_pos=, render_3d_window= and pixel_size=. The good news is that, if you have converted an FS98 panel for use in CFS, CPD will allow you to move/size the gauges, change .bmps and change the size and shape of the exterior view. The bad news is that you'd better be using nothing but FS98

gauges. CPD doesn't know how to handle the large CFS .gau files that are configured in the CFS panel.cfg files with exclamation points. It will assign new values to the sub-gauges, and the values will be correct. What is strange is that CPD always writes gauge lines in all capital letters. This works fine in FS98 but is a disaster with the large CFS gauges. To get the modified gauge lines to function, you need to text edit them so that only certain letters are capitalized. Doesn't that sound like fun?

On balance, these CFS limitations probably only amount to a minor criticism of CPD. A pessimist would say, "Isn't it awful that it doesn't work completely with CFS?" An optimist might say, "Isn't it great that it not only works terrifically with FS98, but also works a bit with CFS?" Hopefully, the production version or upgrades will address the CFS deficiencies. I suspect CPD will be around as long as Microsoft keeps doing flight simulators. Whoever wrote the program, they certainly knew what they were doing and they shouldn't have any trouble upgrading it.

To summarize, like I said at the beginning, this powerful tool should be an immediate hit with veterans and rookies. It turns the previously tedious business of panel design into a simple point-and-click, drag-and-drop operation. Even the old-fashioned method could at times be fun. With CPD, it can now be an absolute joy. I already can't remember what life was like without it, and I heartily recommend it to anyone who wants to make panels. It's a winner!

For More Information

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Custom Panel Designer is distributed by Abacus (www.abacuspublisher.com). Full Throttle's publisher Arnie Lee is also CEO of Abacus. Chuck Dome is an independent author and developer.



Review of the new program from Activision

FIGHTER SQUADRON: SCREAMIN' DEMONS OVER EUROPE

Reviewed by Rod White

WW II combat simulation became a very competitive market this past holiday season. We saw releases from Jane's Combat Simulations (WW II Fighters), Microsoft (Combat Flight Simulator), Microprose (European AirWar) and even SSI and Eagle Interactive sneaked Luftwaffe Commander onto the shelves to meet the demands of the holiday shopping season. However, a few titles have been in the works even longer than any of these newly released products. Fighter Duel 2.0 was one of them that looked pretty good, featuring amazing 3-D aircraft with detailed and fully articulated moving parts. But sadly, I must report that Infogrames,

the publisher, killed the project. We may see bits and pieces of it resurface in time as another project, but it won't be the vision that once was Fighter Duel 2.0.

Yet, another WW II combat simulation project has been in the works for quite a while. Fighter Squadron: Screamin' Demons over Europe was supposed to surface last holiday season, but did not quite make it. At one time it was just called Screamin' Demons, but they wanted people to know exactly what it was all about, so they changed the name. I thought that Screamin' Demons alone made it sound like a wild arcade shoot-'em-up. So changing the name was a good thing, and it helped define clearly that it was a WW II combat simulation.

The developer of Fighter Squadron: Screamin' Demons over Europe is Parsoft Interactive, and the simulation is being published by Activision. Parsoft's last product was the A-10 Warthog simulation published by Activision, titled A-10 Cuba! It featured fantastic flight modeling, but it lacked enough missions to please the hard-core and even the novice combat simulation enthusiast. But this title did show that Parsoft and Activision had the combined potential to put together something even more spectacular.

*The Typhoon
seeing action over
North Africa*



Fighter Squadron: Screamin' Demons Over Europe

What makes Fighter Squadron different?

Fighter Squadron isn't just another WW II combat simulation. Some very unique qualities help it stand out, even in an already crowded market full of high-quality WW II combat simulators. WW II Fighters, Combat Flight Simulator and European Air War all depict bomber aircraft, and you can escort and shoot them down. However, you can't fly any of them right out of the box. Sure, with Combat Flight Simulator you can plug in just about any plane made for it or for Flight Simulator 98. However, it is not quite the same as having a bomber created by the developers with the ability to use the bombsight, fly the plane and occupy all of the gunner stations on board. Fighter Squadron gives you all of those capabilities right out of the box!

The Aircraft

The bombers you can fly include the British Mosquito and Lancaster MK-II, the American B-17G Flying Fortress and the German Ju-88A4 bomber. You can also fly fighter aircraft like the American P-51D Mustang and P-38J Lightning, the German Me-262A and Fw-190A, and the British Spitfire and Typhoon MK-1B. This is a very impressive lineup, especially considering you won't find a player-controllable Typhoon, Flying Fortress, Mosquito, Lancaster or Ju-88A4 to take command of right out of the box in any of the competition's products.

Visually, this is a very nice looking product. I still have to give top honors for visual quality to Jane's WW II Fighters, because it uses the most advanced graphics engine around. But by all means, Fighter Squadron looks the part, and in many ways it looks almost as good. In my opinion, Fighter Squadron looks better than European Air War, and the aircraft and 3-D-cockpit art are ahead of what you find in Combat Flight Simulator (CFS). But to be fair, CFS has them all beaten when it comes to terrain graphics, flight modeling and 2-D-cockpit art.

Total Combat Environment

You will really want a 3Dfx Glide- or Direct 3D-compliant graphics card to get the most out of this product, although 2-D software rendering is provided as well. Even at the default of 640x480 under Direct 3D it looks great,

The Flying Fortress passing over a port and towns below



A Spitfire breaking through the gorgeous cloud layer



Sitting back into the wide-angle cockpit view



Manning the ball-gunner turret



One of the many gun stations on the B-17G



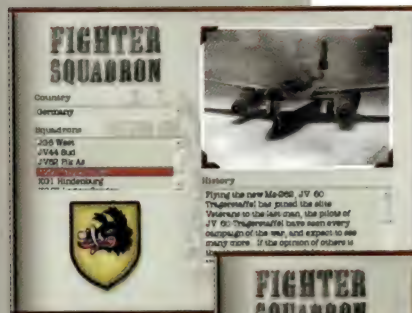
Fighter Squadron: Screamin' Demons Over Europe



No WW II combat simulation is complete without a P-51D



Reading the map while in flight



Visiting the Squadron section (left) and taking a peek at the Hangar section (below).



The Me-262 at low altitude, flying over a town

and under 3Dfx Glide at 1024x768 on dual Voodoo II boards, it played smoothly and looked fantastic! The 3-D-cockpit art is almost on par with what you see in European Air War, and the external aircraft art and detail come close to matching what you'll find in WW II Fighters, minus the extra effect of wear and tear Jane's depicts so well visually. When receiving damage, you also see various parts flying off, getting smashed up and being blown completely apart, thanks in part to the excellent damage modeling they have achieved.

One environmental effect they've managed to replicate better than any combat simulator so far is the 3-D clouds. Until now, the clouds in WW II Fighters were the best around visually, but the 3-D clouds in Fighter Squadron are clearly superior. Various layers of clouds can be seen, depending on the weather conditions. On a very cloudy day you will run into hordes of 3-D clouds occupying the skies. These clouds also move, change shape and morph together to form larger cloud formations! Flying through them is also a treat, and I have a notion they will be excellent tools to use tactically in multiplayer engagements.

Some of the 3-D-cockpit art really stands out, too. The Ju88A4 cockpit art is truly a work of art. The wide-angle view gives you the ability to zoom in and out of each and every cockpit. This allows you to line up a shot on a bogey at close range when zoomed all the way in to the gun-sight, while also allowing you to get a wider view of your surroundings by zooming back in to the cockpit. For the casual combat simulation enthusiast, a quasi-HUD mode can be toggled on, giving the player altitude and airspeed data that makes flying these classic warbirds a little easier.

The Program Interface

The interface is very reminiscent of the interface you'll find in European Air War, because while in it you will hear actual vintage radio broadcasts made by Roosevelt and Churchill, which helps transport you back in time. The in-flight sound effects of gunfire, bombs dropping and damage is done well, too. Overall, it sounds as good as it looks.

Sadly, there is no true campaign, but the action takes place in three different theatres: Dover, Rhineland (both in Europe) and North Africa. This is a breath of fresh air for most of us, because of North Africa's desert setting. If you are tired of flying and engaging enemies over Europe, you will appreciate the North African terrain and missions. Since there are no real campaigns, you can pick and choose to fly any of the ten pre-scripted missions provided for each theatre, in any order.

Fighter Squadron: Screamin' Demons Over Europe

From the interface you can access Pilot, Missions, Training, Hangar, Scramble, Squadrons, Network and Options.

Pilot is where you sign in before taking flight, and here you can select to be an American, German or British pilot.

Under Missions you find the meat of the simulation, and all of the missions are separated by theater (Dover, Rhineland and North Africa).

In Training, you will find individual missions for each of the planes, covering take-off, landing and various bombing exercises for the multi-role and bomber aircraft.

Hangar gives you an overview of each of the planes offered in Fighter Squadron, with the ability to click on the Test Flight button at any time to take one for a spin.

Scramble is the equivalent of your basic Instant Action or Fly Now selection, featuring the option of cycling through a few different mission types before taking flight.

Squadron features a historical overview of British, American and German squadrons from the Second World War, complete with the authentic squadron insignia patch and a few words about each one.

Under Network, multiplayer options are provided for LAN and Internet play, but we didn't have the time to give them a spin to see how well multiplayer support is implemented. There's also the issue of Open Plane, which will allow users to create their own planes for Fighter Squadron. The problem is it's very hard to comprehend. Activision is working on allowing third-party developers to create an interface for Open Plane, but at press time no official announcement has been made about the future of Open Plane. It does exist, because this is how Parsoft and Activision created the planes for the simulation. Additionally, the plan has always been to release this information to the public, allowing them to create their own planes.

Under Options you can toggle the ability to jump into any plane in the missions, so there is actually more than one way to play each mission. Also, the mission objectives for each scenario will be different depending on what country you fly for.

If and when you get tired of all of the pre-scripted missions, a mission editor is provided, giving you the ability to create your own. The editor is easy to use, so you can start making your own missions right out of the

A look inside the amazingly detailed Ju88 cockpit



box. Even a casual combat simmer should be able to be in the air, bombing airbases or shooting down bogeys in just minutes.

Flight and Damage Modeling

Parsoft was very meticulous about flight and damage modeling. Each of the aircraft handles as we can envision their real-life counterparts would. They also break apart nicely, but this isn't as visually dramatic as what you find in WW II Fighters. That does not mean damage modeling isn't slick, because it really is. They create an aircraft, then chop it up into about twenty-five pieces, then put it all back together. Then they track the location and degree of damage these pieces take and make sure the aircraft actually flies as it should under these conditions. Various parts will be damaged or completely fly off, and the plane will respond accordingly. Better yet, once parts do start coming off, they're given their own flight characteristics. So, parts don't just fly off and disappear; they can damage your plane or other planes as they make their way to the ground.

Fighter Squadron: Screamin' Demons Over Europe



This P-38 has seen better days



Look at those amazing 3-D clouds!

The missions themselves can leave you feeling a bit alone in the skies, because you won't have encounters of the same magnitude as those found in European Air War and WW II Fighters.

Most of the time encounters only feature a small number of AI aircraft. The real draw of Fighter Squadron is the ability to fly the bombers, to conduct the bombing missions, the fantastic 3-D clouds and being able to fly some of these missions over North Africa.

It does have nice flight and damage modeling, but today that has almost become a standard feature. They did a pretty good job with the detail on the ground, where you will find shore batteries, abandoned and broken down castles, towns, docks and even dams. But it would have been nice to see moving tanks, trucks and other objects down below as well.

All in all, Fighter Squadron: Screamin' Demons over Europe was late to market, and because of this it is not the "A"-class product it would have been just a year, or even six months ago, before products like WW II Fighters, Combat Flight Simulator and European Air War surfaced.

However, it does look good, it flies right, and has some nice features that none of the competition offers. With a mission editor that's simple to use and the hope of Open Plane surfacing—the future looks bright for Fighter Squadron.

Artificial Intelligence

Flying the bombers is a both a treat and a challenge. You can either let the artificial intelligence (AI) handle the bombing and all of the various gun stations on-board, or you can cycle through these stations manually, picking and choosing which ones you control. While doing so, the AI takes command of flying the plane and the other stations. The ball gunner is a lot of fun to command, and when taking command of the bomb-sight you also take command of the plane, which is a little disorienting at first, but once you get the hang of it you will wreak havoc on the ground in no time.

Conclusion

It is really hard to knock it, but Fighter Squadron will not be replacing European Air War and WWII Fighters on the hard drives of the majority of combat simulation enthusiasts any time soon. This is not saying that it is a bad product, but it does lack the usual variety of different AI aircraft that you would normally encounter in a combat simulation.

It would have been nice to see AI P-47s, Me 109s, B-24s, B-25s, Stukas and other important aircraft from the era populating the skies around you during missions. Unfortunately, Fighter Squadron only features the user-flyable planes for AI aircraft in the skies of every mission.

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A Preview Of The Fly!

General Aviation Flight Simulator from Terminal Reality

By Tim Dickens



For more than 16 years, Microsoft had a monopoly on general aviation (GA) flight simulation with their popular Flight Simulator program, which has spawned eight generations of continued development. GA flight simulation started from primitive roots by today's standards, running on the old Apple and then the XT and 8086 microprocessor machines (anyone remember BAO's FS for the Apple? I think I still have mine).

Then came the 1997 holiday season, and the introduction of Sierra ProPilot, which has itself fostered a second generation of development. Microsoft no longer had the monopoly on GA flight simulation.

Now, in the spring of 1999, near the dawn of a new century, we are looking forward to the dawn of a new generation of GA flight simulation. Computer technology has come a long way since my old 8086 machine, which my neighbor now uses as an anchor for his boat. Today's "muscle machines" now feature 400 MHz + processor speed, 10 gigabyte hard drive storage and incredibly fast 3-D accelerator video systems with more video RAM storage than the hard drive capacity on my old boat anchor.

GA flight simulation software publishers are racing full-sail to develop new features and capabilities to take advantage of the gale of ever-changing hardware technology, bringing the spirit of competition in its wake.

The christening of a third GA flight simulator, Fly! from Terminal Reality, gives that spirit of competition new vitality. Although Terminal Reality has not yet threatened to tumble Microsoft from its long-held throne, their mere presence in the market will have the effect of mass steroid consumption on the continued development of GA flight simulation.

Fly! is slated for release in late April, 1999, right after this issue of *Full Throttle* meets the public. Long-time flight simmers may recognize that Mark Randel, Terminal Reality's President, was one of the program designers with BAO (Bruce Artwick Organization) who helped produce the renowned scenery engine for Microsoft's Flight Simulator v. 5.0. I have had the opportunity to look at the beta version of the software, so that I can offer this preview to you, our readers. Keep in mind that the program we have in our hands right now is not 100% of the program. The folks at Terminal Reality still have more work to do, so we will not belabor them with going through the fine details on how everything works at this point. After Fly! is released this spring, we will do a full review, most likely in the June/July 1999 issue of *Full Throttle*.

For now, we will provide you with this sneak peek at Fly! and let you see some high-resolution screen shots to give you an idea of what the simulator is all about. Fair enough?

General specifications

Fly! is a GA flight simulator, which will be released for both PC and Macintosh PowerPC processor platforms. The following are the minimum requirements, as provided in the technical material from Terminal Reality:

- ✈ 233 MHz processor speed
- ✈ 1 GB hard drive space for minimum install
- ✈ 64 MB system RAM
- ✈ 4 MB video RAM
- ✈ 4x CD-ROM drive
- ✈ DirectX 3.0 or later (Intel) or GLide 2.5 or later (Intel & Macintosh)
- ✈ A good 3-D-accelerator card is strongly recommended, but not 100% necessary to use Fly!

The Scenery

The scenery is based on digital elevated mesh terrain, using data from the USGS (US Geological Survey) and Landsat satellite images. The scenery is rendered in 25m, 20m, 10m or 5m per pixel. Over 9,000 airports will be included. Where they are and how much detail these airports will have is not known at this time. The beta program only consisted of the San Francisco, New York and Los Angeles areas. The release version will include five "primary" scenery areas, each covering 100x100 square miles. Detailed satellite photography and digital elevated terrain will be used within these primary scenery areas. Outside of these areas, general textured "tiles" will be used.

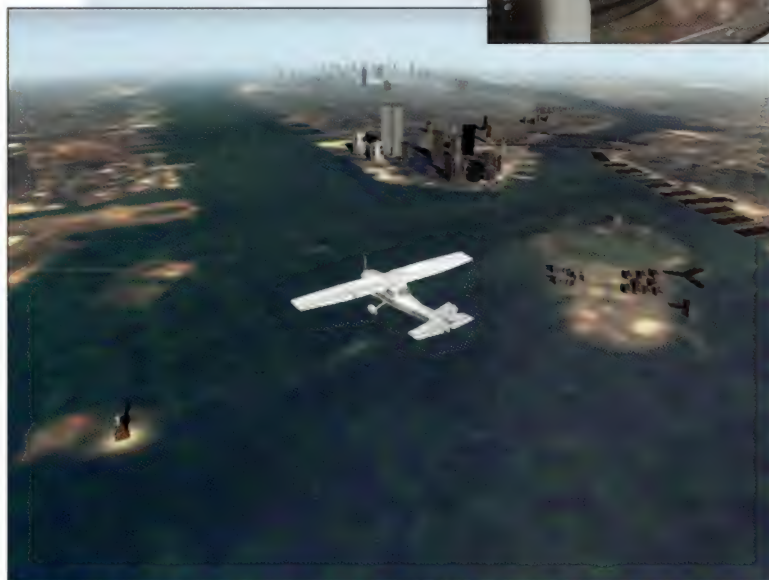
The Aircraft

The aircraft in this first release will consist of five, precisely modeled general aviation aircraft:

External data files that you can edit to modify performance, visual model, cockpit artwork and electrical systems will define the configuration and performance of each aircraft. As the pilot, you can adjust some realism settings from the menu, including prop and mixture controls, gyro drift, battery drain, icing and accurate ground traction.

The avionics and radio stacks are visually styled in the Bendix/King form and layout. Each instrument panel is fully functional with mouse clicks (though "dummy" switches still exist here and there). Pop-up windows will appear over hot spots on the instruments, displaying what the instrument is and its exact reading, which is particularly useful for the smaller gauges.

The panel system will take quite a bit of getting used to, at least for old-time MS Flight Simulator users like myself. Rather than having a sizeable panel and outside view, you have a full-size panel below a full-screen outside view. Scrolling the panel up and down controls their relationship. With the panel scrolled all the way up, to view the entire panel, the outside view is completely blocked. Increasing the outside view to a "normal" view cuts off most of the panel. However, a "mini-panel" can be called up to show the vital gauges in a strip along the bottom of the screen. Like I said, it will take some getting used to.



Building on the Current State of the Art

Because Fly! is the new kid on the block, it has the advantage of coming out of the box the first time with features that old-timers like me consider quite advanced. "Extras" such as a realistic Global Positioning System (GPS), cockpits with 100% functional switches, navigation tools/flight planning, and user configurable weather environments are all standard features. Here is a rundown:

On-line sectional charts and navaid database will allow flights throughout the U.S. and other major countries. On-line sectional charts for selected areas are accessible in pop-up windows. Overlaid on these sectionals will be a moving map representation of your position and aircraft orientation.

The extensive flight planner will configure waypoints, fuel consumption, aircraft weight/balance and generate a complete flight plan with course, time of arrival, etc.

The user-configurable weather generator sets visibility, temperature, wind speed and layers of 3-D alpha-blended clouds that you can actually fly inside, and they do not look like Legos.

The ability to import METAR weather data from the US Weather Service lets you fly through the weather that is really outside.

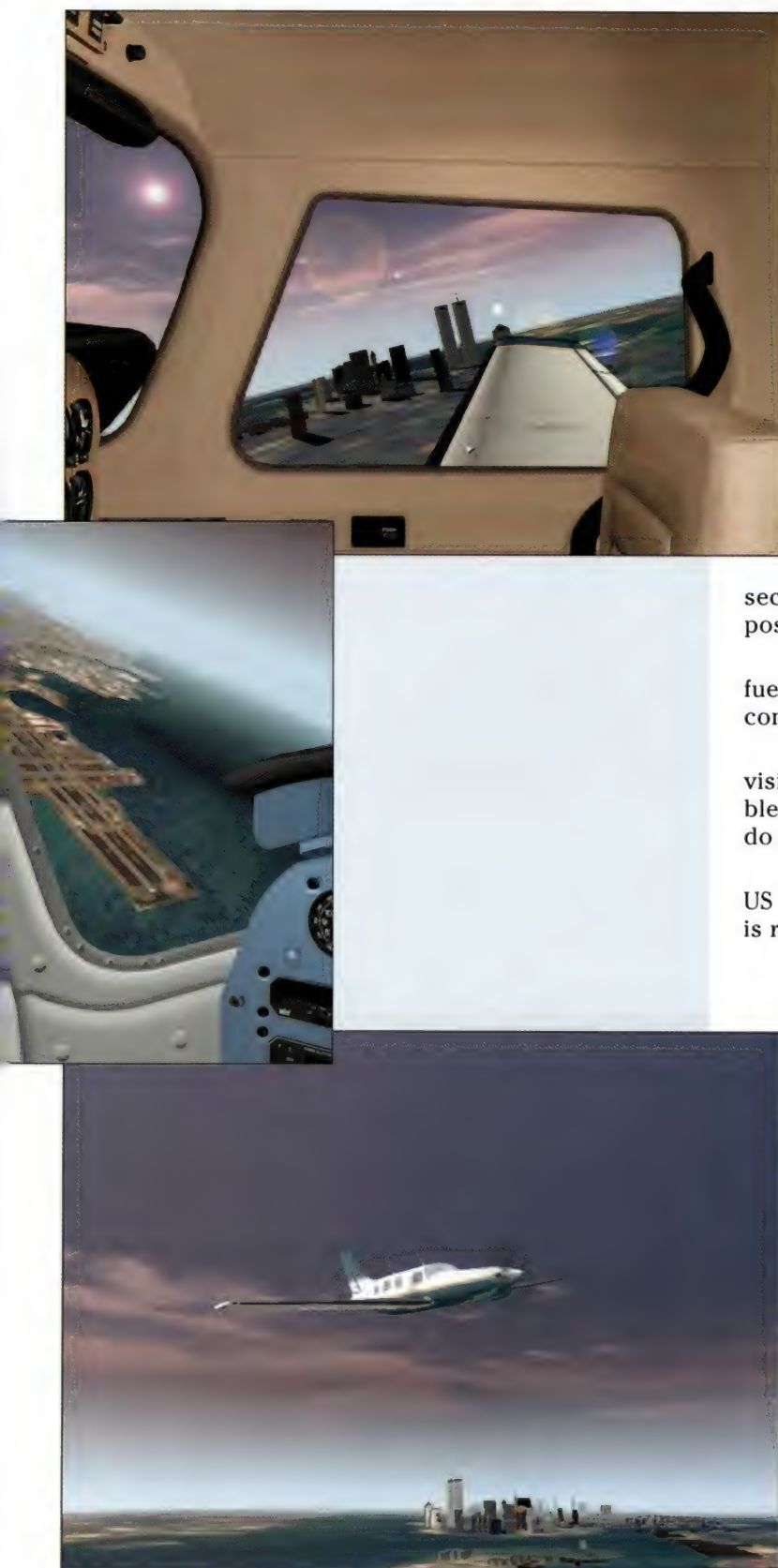
Interactive Air Traffic Control (ATC) with full voice support provides realistic chatter and directs artificial intelligence (AI) aircraft.

See realistic dynamic scenery in the air, on the ground and on waterways.

Range Finder interactive environment will display an object's distance and obstruction height by simply pointing the cursor. Double-click on an airport within view and a pop-up menu will provide data such as runway/navaid information, ATC and localizer frequencies.

Distance compression shortens the distance to your destination. Instead of increasing the simulation rate and making the aircraft difficult to fly, this feature actually shortens the distance, at the same sim rate.

Enjoy multi-player mode with voice chat feature.



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Hardware Support

Fly! will support all popular force-feedback, standard joystick and flight yoke configurations. It will also feature native Voodoo/ Voodoo II Rendition and Power VR 3-D acceleration support. All other video cards and 3-D accelerators will be supported via Direct3D. On PCI 3-D accelerator cards with 4 MB of video RAM, Fly! will run in 640x480x16 display mode only. 12-MB and 8-MB PCI cards can run in resolutions as high as and 800x600x16. The current technology in AGP (Accelerated Graphics Port) card resolutions will only be limited by their video memory/system memory configuration.

Third-party Development

Arnie Lee had a chance to speak with Jeff Smith of Terminal Reality at the recent Milia Games Exposition in Cannes, France. Here is what Arnie had to say about his conversation with Jeff:

"Developers will be interested in hearing about Fly!'s "open system" approach in their new simulator. Terminal Reality will soon release a simple scenery editor that lets you increase the density of the digital terrain model for

creating more extensive detail. Fly!'s 3-D objects are created with 3D Studio Max or a compatible format. The scenery editor will let you add new 3-D objects by following the specifications in their upcoming SDK. Also, shortly after the release of Fly!, they will release an SDK for making additional aircraft."

One of Microsoft's tremendous advantages is the huge third-party scenery and aircraft market, which they have had the benefit of for the last 16 years. The addition of third-party development tools from the SDKs Terminal Reality promises to release will make Fly! the most serious competition for Microsoft to date. And it will certainly make the simulator much more attractive to guys like me who live to make scenery, and for those dedicated virtual aircraft engineers who have given us so much variety to fill our flight sim hangars.

We are really looking forward to the final release of Fly! to try all of the new features, which were not yet functional at the time of writing this preview. Let's face it, three GA flight simulator programs? That's not too much for my hard drive, is it?

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A Look At Concorde SST

Reviewed by Tim Dickens

Concorde SST, produced by Flightsim Developers and published by The Associates, is labeled as "The ultimate flight experience." While that may be just a bit of embellishment, I found flying the Concorde SST quite enjoyable.

Achieving supersonic flight in FS 98 is not easy to accomplish. A typical flight model will start to shake apart at 0.75 to 0.85 mach, as the compressibility effect starts to affect the stability of the aircraft. Although this effect is not specifically modeled in FS 98, flight at those speeds is not something that the flight dynamics in FS Flight Shop flight models, for example, are capable of handling. So, one usually experiences a coincidental instability, which has the same effect.

And then, of course, supersonic flight poses even more problems with respect to stability. It takes quite a bit of expertise to "fudge the numbers" within a dynamic flight model to produce an aircraft with enough thrust and enough dynamic stability to perform at those speeds.

The designers of Concorde SST achieved this quite well, providing a very realistic flight model.

Installation

You will need about 30MB of hard drive space, which used to be considered a lot for an FS add-on, but not really any more.

The CD comes with an installation program that works quite well and will place all of the files where they belong. I do caution you to pay attention to the first install sequence, where the InstallShield asks you to confirm where to install Concorde SST. It is really asking you for the location of FS 98 on your hard drive, but it does not say that clearly. Make sure you specify the correct path on your hard drive to FS 98, or this bird won't fly.

Manual and Documentation

In this case, I should say "Manual, Documentation and Video." Concorde SST comes with a very thorough manual, outlining the features of the aircraft, its history (for the aviation history buffs) and detailing the operation of the instrument panel. The instrument panel is similar

Concorde SST in several different paint schemes



A Look At Concorde SST!

to the actual Concorde panel. It requires special commands if you want to get at all of the controls and gauges, so I strongly recommend you familiarize yourself with the manual and keep it handy until you become accustomed to flying this aircraft. The manual was very concise, with well-written instructions.

In addition to the written word, Concorde SST comes with a very interesting 104-minute videotape of a Concorde flight from London Heathrow to New York. In the video, the captain takes you in detail through the entire flight preparation, take off, cruise, and landing in New York. This is a nice addition to the package.



Custom panel for Concorde SST

Moving Parts

One of the undocumented features in FS 98 is the ability to add animation to an aircraft's .MDL file, which tells the simulator how to display it on the screen. A number of people have tapped into this secret, and we

are beginning to see add-on aircraft exhibit this trait. Flightsim Developers have incorporated this new technology into the visual model in Concorde SST.

I have to admit to being an early "so what" skeptic regarding moving parts, but after seeing them in action on this and other aircraft, I have to say that it is kind of slick. Of course, this only means anything if you are looking at the aircraft in spot mode, but it is enjoyable watching the landing gears slowly extend and retract realistically, instead of suddenly appearing like in a film that skipped a dozen frames. This is another nice touch for Concorde SST.

The Aircraft and Liveries

Concorde SST comes with one basic aircraft, painted in thirteen different liveries:

- British Airways 1970s style
- British Airways 1980s style
- British Airways 1990s style
- British Airways 1997 style
- Paint scheme as seen in the movie Airport '79
- "Corporate" paint scheme (in this case the corporation is Flightsim Developers)
- British Aircraft Corp.-BSST prototype
- Singapore Airlines
- Air France "Pepsi" paint scheme
- Air France 1997 paint scheme
- Air France original paint scheme
- BOAC Speedbird paint scheme
- Braniff prototype paint scheme

taking off from Kansas City International Airport



A Look At Concorde SST

Innovative Concorde features are incorporated into the basic aircraft. In addition to the animated landing gears, you can raise and lower the nose cone, along with the visor, which is used during supersonic flight because the skin of the aircraft actually heats up quite a bit. It also features lighting afterburners and moving control surfaces.

As I mentioned above, the flight model seems very realistic (let's face it, you are only guessing unless you have actually flown one). Maybe it's too realistic. You have to fly the aircraft "by the book," and it is a very difficult beast to master during the learning curve. You must climb to cruise altitude with just the right amount of fuel, or you will be too heavy. Likewise, the correct throttle settings are hard to determine. If you want to get from New York to London without taking a dip into the Atlantic, you have to do everything just right.

And what I said above about modeling for supersonic flight notwithstanding, compared to sub-sonic aircraft you have flown, you will find this aircraft a bit more difficult to control.

The manual is helpful for getting the hang of the controls, and the four adventures that come with Concorde SST can be helpful as well.

Custom Sounds, Adventures and other Goodies

The custom sound package is A-OK and provides realistic sounds. The afterburner sound is a great window-shaker.

As I mentioned before, there are four adventures. The first is a training adventure, the second is a "final-exam" adventure, to test what you learned in the first adventure. The last two are flight adventures, one from New York to London and one going the other direction. The custom

.wav sound files that come with it offer quite authentic British accents for ATC commands, etc. This adds to the realism of the flight.

With respect to the "other goodies," these are two sceneries of fictional locations between England and Ireland, out in the Atlantic. They are nothing special and do not add anything to this package. Considering the number of unwanted entries (rather than a single entry) that it puts into the FS 98 GoTo | Airport | FS 6 and before menu, they could have just as well left these out.

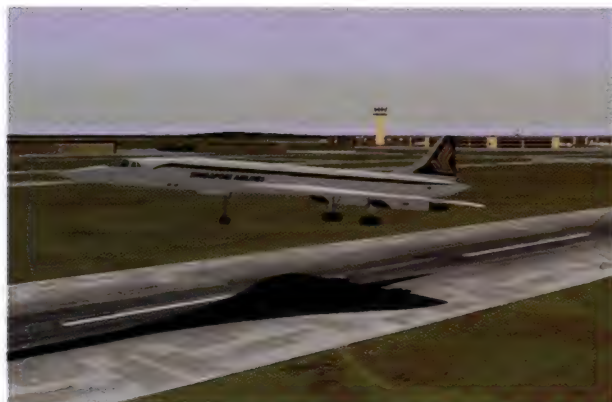
Conclusion

If you enjoy flying the "heavies" and have been particularly interested in flying the one and only supersonic commercial transport "across the pond," then you will enjoy Concorde SST. It is a high-quality software package.

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Making a Procedure Trainer for the 442nd Search and Rescue Squadron

By Al Pelletier

The start of the project

Sometime in November '97, I received a call at work that took me by surprise. On the line was Captain Marty Zimmer of 442nd Search and Rescue squadron (Canadian Armed Forces). "Al, can I come over to your house and have a look at your flight sim setup?" he asked.

This wasn't so unusual, since many local folks knew that I was heavily into MS Flight Simulator and that my store (Xcalibur Computers) was centered on selling Flight Simulator orientated computers and add-ons. But he caught my attention when he mentioned that it was for student pilots and not for his own use that he was interested. This got my pulse going faster for a minute or two.

I had been using Microsoft Flight Simulator since version two. Real-world pilots usually shrugged off PC computer flight simulation, thinking that it was "just a game" with absolutely no benefits for real flying. That night, Captain Zimmer came to the house and I gave him a demonstration of what I had on my home machine. I started by doing ILS approaches at New York's La Guardia airport in a DC9. The airplane had been designed and tuned for Flight Simulator by Mike Vidal of Miami, Florida and the panel had been created by David Durst of Chandler, Arizona.

I changed the weather a few times and brought the limits down quite low and managed to get the airplane down within safe parameters. Captain Zimmer was more than impressed. "We pay big bucks for a procedure trainer in San Diego that isn't even as good as this," was one of his remarks.

The next thing I did was show him the De Havilland Canada DHC-5 Buffalo airplane, which is flown by the 442nd. Eric Mitchell of Comox, BC had designed the Buffalo for Flight Simulator. Eric's design was a favorite of many flight simmers due to his attention to details, both in the visual and flight dynamics of the model. The DHC-5 Buffalo was developed from the very successful DHC-4 Caribou Short Takeoff and Landing (STOL) transport. The impetus for the creation of the Buffalo was a US Army Request for Proposals for a new STOL tactical transport in May 1962.

The main differences between the Caribou and the Buffalo are the replacement of the Pratt & Whitney R-2000 radial engines with GE T64 turboprops, re-arrangement of the tail surfaces, and enlargement of the fuselage to accommodate a load comparable to that of the CH-47 Chinook helicopter. The 442nd Squadron has five of these for Search and Rescue (SAR) aircraft, along with five CCH113 Labrador helicopters.

Captain Zimmer wasn't even aware that we were already flying a version of their airplane, although no realistic panel was available for it at that time. Part of the demonstration also focused on the various flight controls and peripheral add-ons for Flight Simulator, such as the CH Pro yoke, Pro Pedals and Pro Throttle, which all together gave the sim an even more life-like feel.

At this point, I'd like to add that the 442nd Squadron was after a "Procedure" trainer and not a true-to-life flight simulator, which incorporates three-axis motion and is worth millions of dollars. What they wanted to know was, could this "hobby like" Flight Simulator be useful to train student pilots in the art of Instrument Flight Rule (IFR) procedures at an affordable cost? My answer was a definite yes!

Making A Procedure Trainer

Going to work

After going through all the normal and necessary channels to get a proposal like this approved, we were commissioned to create a system for their use in January 1998. It would be a prototype that might be looked at by other squadrons in the Canadian Air Force.

What they wanted:

The most powerful home-base type computer available at the time, equipped with Microsoft Flight Simulator 98, all of the necessary hardware, including yoke, pedals and throttle.

A re-designed and re-tuned DHC-5 Buffalo airplane with a functional and accurate panel.

The necessary scenery to cover the areas served by the 442nd Squadron. Their budget for the prototype, a mere \$5,000.00 Canadian (about \$3,800.00 US)!

My answer, of course, was "Piece of cake!" Reason being that I knew some of the best freeware designers out there. I immediately contacted Mike Vidal (for the flight dynamics), Eric Mitchell (for the visual model), David Durst (for the panel) and Doug Keech (for some scenery). Our only pay for this project would be a framed picture of a Buffalo in 442nd colors, at the end of the project. They would, of course, pay for the computer, which was to be provided by my store, and for any technical support needed in the future. Also part of the deal: the whole project, once completed, would be released on the Internet as freeware for all Flight Simulator enthusiasts to enjoy.

As mentioned above, the 442nd Squadron also flies the CH113 Labrador helicopter. As most of you know, the default helicopter in Flight Simulator 98 is not very easy to handle. It's almost impossible, actually! I had made Captain Zimmer aware of this, and we'd decided to go with just the turbo prop Buffalo model, for now. But Major Tom Mitchell (a pilot at 442nd Squadron) changed all that by becoming a member of the team, along with Keith Clifford of Stoney Creek, Ontario, who had designed many Canadian Air Force planes for Flight Simulator. Both of them would make a great contribution to the project.

Building the aircraft

The next part of the project was to acquire data on the DHC-5. I must note that 442nd spared nothing on this. We got all the necessary drawings, pictures and data required to make and update the models in March 1998. Everything was done by e-mail (and lots of e-mails, believe me). Scanned pictures of all the data, drawings and pictures were sent to all the designers.

Installing the system

The system itself was installed in a small room at the 442nd Squadron in April 1998. The computer was a Pentium II-266 with 128MB of RAM, 6GB hard drive, and an ASUS 3D Explorer video card (soon to be replaced with a Riva TNT 128 or a Matrox Millenium G200). For a monitor, they opted for a 21" ViewSonic. All the controls were from CH Products.

The student pilots started flying the procedure trainer immediately, using the original Buffalo and the default Boeing 737 panel. Typically, the student would take off from Comox and proceed to Powell River across the Georgia Strait for an NDB approach. From there he would fly to Campbell River, up Island, for an ILS approach, and then back to Comox for another instrument approach, all the while being monitored and briefed on procedures by an instructor sitting beside him. They call the routes "Round Robins," appropriately, I might add with a grin. I must mention here that they are using the BC 98 scenery by Donnie Chisholm of Quesnel, BC, and the BC NORTH scenery by Doug Keech of Kitimat, BC. Both of these authors have done a super job with their scenery creations.

Measuring the results

The results started to appear for testing in May 1998. By that time, Major Mitchell had started working on the Labrador helicopter visual model and panel. The base and starting point for Major Mitchell's model was derived from the excellent work of several authors:

Boeing Vertol CH-46A Skynight by Mike Hill

.air file by Mike Hoefle & Jerry Arzdorf

Canadian Forces C113 textures by Rob Tremblay

Original Chinook cockpit .bmp by Graham Waterfield

Mike Vidal was refining the Buffalo flight model, and Eric Mitchell got to work on new and improved graphics for the Buffalo. After three months of work, beta testing and more work, we had a very good working airplane and panel combined. It was then loaded on the system at the squadron and the students started flying their approaches, using a very accurate panel and flight model.

Making A Procedure Trainer



of the team ever got upset by others improving on their creation. This was truly teamwork!

Mike Vidal had the final flight dynamics completed by September, '98. The aircraft behaves very close to the real thing, according to 442nd pilots, right down to the STOL procedure.

Also by this time, Tom Mitchell had recruited the help of Keith Clifford to do the outside graphics of the Labrador Helicopter. His work came out as nothing short of awesome. The helicopter itself is based on an airplane model with specifications that cheat the system and allow for hover. This was cleverly achieved using flap settings. With full flaps up, the Lab goes into forward flight with the proper amount of torque applied. When you want to slow the airplane down, you simply set flaps and into the hover you go. By varying the amount of torque, you can

Teamwork

By August 1998, the 442nd were using the new Buffalo panel. It had been completed by David Durst and refined by Maj. Mitchell. One note I'd like to add here: No member

Internet links

Information on the 442nd Squadron can be found at:

<http://ark.com/~wcomd/442nd.html>

The aircraft and scenery can be found at:

<http://wings.ark.com>

You will be rewarded with two fantastic airplanes and panels at no cost.

Go to the Files section, scroll down to the section entitled Downloading Files and select the Canadian Section. Then select Quick Link to the Canadian Section FTP site for the rest of the files.

Aircraft:

dhc5_442otf.zip

CAF de Havilland Canada DHC-5 Buffalo - 442 (SAR) Sqn
By Eric Mitchell. Package includes sound and panel.

ch113a310.zip

Canadian Armed Forces CH-113 Boeing Vertol - 442 (SAR) Sqn

By Keith Clifford/Tom Mitchell. Package includes sound and right-seat panel.

ch113a318.zip

Canadian Armed Forces CH-113 Boeing Vertol - 442 (SAR) Sqn

By Keith Clifford/Tom Mitchell. Package includes sound and left-seat panel.

Scenery

You can get Doug Keech's BC North scenery from:

<ftp://wings.ark.com/pub/iup-mirror/uploads/bc-north.zip>

Also, Donnie Chisholm's BC 98 scenery can be obtained from:

<ftp://wings.ark.com/pub/iup-mirror/uploads/bc98v1.zip>

Making A Procedure Trainer

maintain hover or descend and land. It is just a dream to fly, and I've yet to find better flight dynamics on helicopters for Flight Simulator 98.

Project Completed

Everything was completed by September 1998. The Buffalo and Labrador set a new standard for flight model and dynamics and, to complete the deal, the files are now available for the Flight Simulator community at wings.ark.com.

Where will this project lead? Well, one member of the team is now in charge of setting up a similar system for a large flight simulator company. Should the Canadian Armed Forces decide that they want this for all of their squadrons, they know which door to knock on—ours, I hope!

Meanwhile, all serious flight simmers can take their hobby a bit more seriously knowing that professional flyers are using it for training.

About the author

Al Pelletier served in the Canadian Air Force for 25 years as Aircrew on Maritime Patrol Airplanes, as an Airborne Electronics Sensors Operator. He was responsible for radio communication, radar, infrared, electronic counter measures and many other detection devices. Although in a non-pilot role, Al flew hundreds of hours in the co-pilot seat and acquired a love for flying. Al has been a Flight Simulator enthusiast since 1982. He is presently taking flying lessons in a Cessna 172 and in a Super Piper on floats.

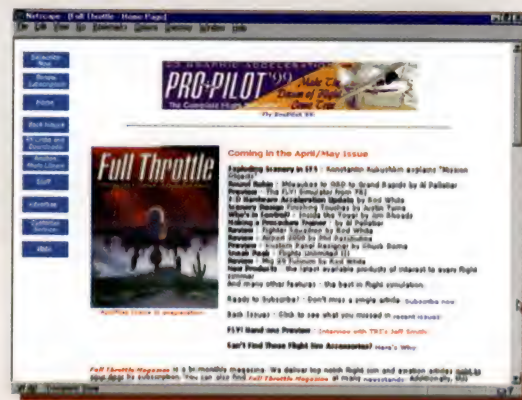
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Don't forget to check out the Full Throttle web site (www.ftmagazine.com). It's the perfect place to start if you're looking for information on flight simulation.

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- ➔ Interview with flight sim legend Laemming Wheeler
- ➔ Details on Combat Flight Simulator
- ➔ Details on Pro Pilot '99
- ➔ Ordering previous issues of Full Throttle

And much more!



www.ftmagazine.com

Sneak Peek

With the expected release of Flight Unlimited III (FUIII) this June, many readers are asking "What's up with this package and what can we expect that is different from FUI?" Although it's still too early to review, Full Throttle did acquire prerelease screenshots and general information to give you a good idea of what to expect from FUIII.

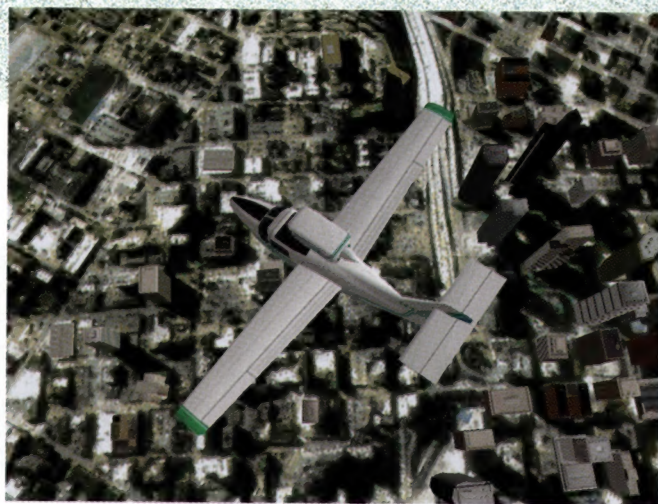
FLIGHT Unlimited III

Most of you know that Looking Glass Studios was purchased by Electronic Arts in the late spring of 1998. EA is no beginner when it comes to producing quality interactive entertainment packages. Given their past record of accomplishments, FUIII could be an interesting package.

Flight Unlimited II, released in the fall of 1997, is the sequel of the original product (Flight Unlimited) that focused on acrobatic aircraft. FUII included 10,000 square miles of photorealistic scenery that covered the San Francisco Bay area, incorporating many new features such as visible rain.

The creators say Flight Unlimited III is not another upgrade, but a fresh new version—the most comprehensive and exciting simulator package to date. FUIII is now based in the Seattle, Washington area featuring 10,000 square miles of photorealistic terrain based on satellite data.

It offers many scenic sites, such as the snow-capped peak of Mt. Rainier and highly detailed downtown Seattle, with real-world weather and four-meter/pixel resolutions.



Two FUIII aircraft include the three wing Fokker DR1 (left) and Lake Renegade 270 Turbo Seaplane (above)

FU III Sneak Peek

Weather seems to be a high point in the package, as LGS claims to be adding a new customizable dynamic weather system based on real weather physics. You will experience moving fronts and weather storms, mountain uplifts, phases of the moon and snow squalls.

Users will have the original five aircraft to choose from, and FU III will include five more, bringing a total of 10 aircraft for the new package:

- ✈ Beechcraft 400A ✈ Mooney TLS Bravo
- ✈ Fokker DR1 ✈ DeHavenot Muskrat
- ✈ Trainer 172 ✈ Piper Arrow
- ✈ Beechcraft Baron ✈ P-51 Mustang
- ✈ Lake Renegade 270 Turbo Seaplane
- ✈ Stemme S10-VT turbo charged Motor

Other features include:

- ✈ Real AI—See other aircraft taxi, takeoff and fly around you. AI aircraft are programmed to follow real-world flight paths and react as real aircraft would.
- ✈ Real ATC interaction operates much like the real world to satisfy real-world instrument pilots.
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For More Information

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Got Guts?

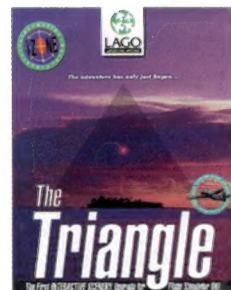
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